DOCUMENT RESUME

ED 111 651 SE 019 517

AUTHOR Buchanan, Aaron; And Others
TITLE Content Analysis of Houghton Mifflin Mathematics Program for Elementary Grades K-6.
INSTITUTION Southwest Regional Laboratory for Educational Research and Development, Los Alamitos, Calif.
REPORT NO SWRL-TN-3-72-29
PUB DATE 25 Sep 72
NOTE 313p.

EDRS PRICE MF-$0.76 HC-$15.86 Plus Postage
DESCRIPTORS *Content Analysis; Curriculum; Elementary Education; *Elementary School Mathematics; Evaluation; Instruction; Learning Activities; *Mathematics Education; *Objectives; *Textbooks
IDENTIFIERS *Houghton Mifflin Elementary Mathematics Series; Learning Mastery System; Southwest Regional Laboratory

ABSTRACT

The purpose of the analysis was to provide a profile of instructional activities related to content and referenced to specified instructional outcome areas. Emphasis was placed on determination of four major factors: (1) major outcomes in the program and their relative emphasis in both regular and supplementary instructional materials, (2) the distribution of content within and across instructional units (chapters), (3) points in the instructional sequence where mastery of outcomes is assessed, and (4) the amount of independent practice in regular and supplementary instructional materials related directly to each major outcome developed in the program. The analysis was based on 12 content strands and 5 substrands. Results of the analysis are presented in a series of tables which show the page locations of topics. Locations of diagnostic tests are also indicated. The completed analysis forms the basis for preliminary specification of an application of Learning Mastery System procedures to the series. (Author/SD)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

SE

ED111651

SWRL

SOUTHWEST REGIONAL LABORATORY
TECHNICAL NOTE

DATE: September 25, 1972

NO: TN 3-72-29

TITLE: CONTENT ANALYSIS OF HOUGHTON MIFFLIN MATHEMATICS PROGRAM FOR ELEMENTARY GRADES K-6

AUTHORS: Aaron Buchanan, Elijah Babikian, Jim Winchester and Sylvia Auton

ABSTRACT

A content analysis was completed of the Houghton Mifflin mathematics series for elementary grades. The purpose of the analysis was to provide a profile of instructional activities related to content and referenced to specified instructional outcome areas. Emphasis was placed on determination of:

1. major outcomes in the program and their relative emphasis in both regular and supplementary instructional materials.
2. the distribution of content within and across instructional units (chapters).
3. points in the instructional sequence where mastery of outcomes is assessed.
4. the amount of independent practice in regular and supplementary instructional materials related directly to each major outcome developed in the program.

The completed analysis forms the basis for preliminary specification of an application of Learning Mastery System procedures to the series.

SE 019 517

~~This document is intended for internal staff distribution and use. Permission to reprint or quote from this working document, wholly or in part, should be obtained from SWRL, 4665 Lampson Avenue, Los Alamitos, Ca.~~

CONTENT ANALYSIS OF HOUGHTON MIFFLIN MATHEMATICS PROGRAM FOR ELEMENTARY GRADES K-6

Aaron Buchanan, Elijah Babikian, Jim Winchester and Sylvia Auton

This document describes a content analysis of the Houghton Mifflin mathematics series for elementary grades. The document is divided into three sections as follows:

Description of the Analysis. Procedures used by staff members of the Southwest Regional Laboratory for Educational Research and Development (SWRL) in performing the analysis are described. These procedures were used to generate descriptors of instructional outcomes from index entries in the Houghton Mifflin teacher's editions and to determine the location of instructional and evaluation activities relevant to these outcomes in various Houghton Mifflin components.

Interpretation of the Analysis. Procedures are recommended for identifying relationships in the analysis table between content organization, evaluation of outcomes, and provisions for individual practice, and for comparing these relationships with those desired in an application of a Learning Mastery System.

Preliminary Specifications of a Learning Mastery System Application. Broad preliminary specifications for the architecture of an application of a Learning Mastery System to the Houghton Mifflin series are presented. These specifications include: (1) a discrete number of broad instructional outcomes that can serve as a unifying structure for assessing pupil progress through various levels of the program, (2) suggested evaluation components, and (3) materials suitable for individual practice on outcomes assessed in LMS throughout the program.

DESCRIPTION OF THE ANALYSIS

CONTENT STRANDS

The analysis is organized around twelve vertical strands of content identified by Houghton Mifflin as basic units of a program structure. These strands are listed below in the order of their appearance in the program scope and sequence chart in each teacher's edition. Five substrands (designated by an asterisk) have been added by SWRL to facilitate the classification of instructional activities.

Numbers and numerals

- Numbers
- Numerals
- The number-numeral distinction
- Ordering
- The number line
- Concrete models for numbers and numerals*

Mathematical operations

- Properties
- Development of addition-subtraction with whole numbers
- Addition and subtraction algorisms
- Multiplication and division algorisms
- Operations with fractional numbers
- Operations with integers
- Extensions

Sets

- Recognition
- Operation

Problem solving

- Mathematical operations*
- Mathematical concepts*

Number sentences
Application of mathematics
Measurement
Geometry

  Nonmetric*
  Metric*

Logical thinking
Functions and graphs
Probability and statistics
Number theory

OUTCOME DESCRIPTORS

For each strand and substrand, a set of outcome descriptors has been prepared by SWRL staff to describe the content at each level of the program. These descriptors are statements of expected outcomes of instruction. An example of descriptors for the "Numerals" substrand of "Numbers and Numerals" in Level 2 is shown below.

1. Read numerals for whole numbers to 999

   Compact form
   Expanded form

2. Write numerals for whole numbers

3. Recognize numerals for fractional numbers

   Words ("half", etc.)
   a/b form

4. State the place value of a digit

   To tens
   To hundreds

Outcome descriptors were derived using the following procedures:

1. All entries in the index of the teacher's edition were partitioned according to content strands and substrands listed in the scope and sequence chart. Since scope and sequence entries over-

lapped considerably between some strands, elementary priorities in classification were followed which eliminated most of the multiple listing of index entries.

2. Within each strand, index entries were translated into a small set of statements of intended mathematical behaviors (outcome descriptors). In some instances, the descriptors are comprehensive, and no subordinate outcomes are included; in other instances, subordinate outcomes are included because major portions of the instructional materials were devoted to their review.

TABLE ENTRIES

Instructional activities (designated lessons) from the core components of the Houghton Mifflin program were classified according to the prespecified outcome descriptors. The core components used were the student text (teacher's edition), the student workbook, and a separate battery of diagnostic tests. Since the purpose of the analysis was to obtain a profile of instructional activities, an exhaustive listing of all activities included in all components was not necessary. Programmed Practice and in-book chapter tests were not included because they were parallel in structure and function to the student workbook and diagnostic tests. Placement Tests were not included because the points at which they intervened in the instructional sequence were not closely related to the existing system of units in the regular program. A description of all supplementary program components is in Appendix A.

Entries in the table are page numbers in the student text, workbook, and diagnostic test batteries where instructional activities pertinent to the outcome descriptor are located. For each entry, the number of items or problems directly related to the outcome descriptor was determined. It was reasoned that item frequencies directly related to an outcome descriptor are better indicators of the amount of independent practice provided in a chapter for each outcome than are page entries. In determining item frequencies, the number, ten, was chosen as a cutoff point since most instructional activities related principally to major outcomes contained at least ten items of practice. An entry of (10) following a set of page entries indicates that ten or more items providing direct practice on the outcome were found in the chapter.

During the course of the analysis, it became necessary to develop conventions for determining item frequencies. Items were counted according to the number of separate responses requiring direct outcome-related performances. In some instances, such as the reproduction of counting sequences, individual responses were not independent of each other. In this case, each separate sequence was counted as a response. In many instances, mastery of a particular outcome, such as recognition of commutativity of addition, would be helpful in making a response, but unnecessary. Where responses could be made as a result of acquisition of some other outcome, especially an outcome that is learned rather early in the instructional sequence (such as recognition of number facts), no items were recorded with the descriptor. Conventions were also developed for classifying problems in activities involving either number line or semi-concrete pictorial models to solve equations.

While use of the model might be helpful in making a required response, it was seldom required that the model be interpreted; a recall of basic number facts or the application of some computation algorithm was usually sufficient. In instances such as these, an item was recorded for purposes of the analysis with a descriptor involving "models" if there were separate representations of the model for each equation.

Actual entries for a particular descriptor are coded as follows:

1. Pages from the student text (or student pages from the teacher's edition) appear in regular typeface with the number of items, to 10, following in parentheses.

2. Pages from the student workbook and the number of related items, to 10, are underlined.

3. Diagnostic test entries are preceded by DT with the number of the test and the number of items related to the descriptor following.

INTERPRETATION OF THE ANALYSIS

CONTENT STRANDS

The distribution of content in the program can be inferred from the analysis in the following ways:

1. Examination of Instruction and Evaluation Entries for a Particular Outcome Across Chapters and Levels. It is possible to draw some conclusions concerning the independence of one outcome from another. If there are several instructional entries, but few review or evaluation entries, it is possible to infer that this outcome cannot be easily separated from other outcomes during instruction. This inference is re-

lated to methods used in development of the analysis. The major source of instruction entries (textbook) was the index of teacher's editions at each level. Since index entries are likely to be classified with as many content domains as are possibly relevant, there was a considerable degree of multiple classification among instructional entries. Review and evaluation entries, on the other hand, were made from a page-by-page analysis of the components. In this case, multiple classification was avoided wherever possible, and activities were referenced to the outcome with the most appropriate descriptor. For example, "number recognition" is implicit in "numeral recognition". Among instruction entries, activities are classified under outcomes related to both skills. However, most evaluation activities do not discriminate between the two skills and, in the analysis, would all be classified under outcomes related to "numeral recognition". Examples of discrepancies between instruction and evaluation entries under the "Number" substrand of "Numbers and Numerals" appear in Grade 1. In this substrand, there are approximately 18 review items and no diagnostic test items dealing independently with content found on over 40 pages of instructional activities. Other examples occur in the "Properties" substrand of "Sets" in Grade 1 where there is only one diagnostic test entry for the entire level. It would be unlikely that strands such as these would be preserved independently in a Learning Mastery System, or at least they would not be identified until mastery of related outcomes could be discriminated clearly from outcomes in other strands.

2. Examination of Entries in the Chapter Columns. For purposes of a Learning Mastery System it is desirable that content included in each chapter be reasonably homogeneous. Unit division should be determined primarily by outcomes to be acquired and their presentation sequence. The instructional entries in each chapter should be spread over no more than 7 or 8 outcomes if evaluation of mastery is to retain some reliability and tests are to remain a reasonable length. Where chapters in Houghton Mifflin provide instruction on more outcomes than this, it may be necessary to defer assessment of some outcomes until they are represented in a subsequent chapter.

3. Examination of all Descriptors for a Particular Content Strand over all Levels of the Program. If there are very few descriptors that differ distinctly, or if the set of descriptors show little hierarchical relationship, the strand probably does not possess strong sequential characteristics of its own. Frequently, as in "Applications of Mathematics", the strand exists primarily for the inclusion of activities where mathematical skills are applied to verbal or pictorial problems. Some strands, such as "Sets" in Levels K-3, exist principally as a model for whole numbers and related operations. By comparison, material devoted directly to the development of concepts related to sets and set theory is relatively minor.

OUTCOME ASSESSMENT

Instructional entries frequently occur in the analysis with no accompanying evaluation entries. In general, this circumstance implies one of the following:

1. Evaluation is deficient.

2. Instruction is primarily in the form of teacher explanation with little or no independent practice for the pupil.

3. Instruction and practice on a particular outcome cannot be separated from a more inclusive outcome.

4. The outcome is minor in comparison to the amount of instruction given on other skills presented in the unit.

Occasionally, an outcome will be assessed at a lower level than that reached during regular instruction. This condition sometimes occurs when the amount of instruction on the skill at the higher level is either very small, or is intended as an extension of an outcome for more able pupils.

The number of items per skill-per unit averages 3-4 for major skills and 1-3 for minor skills. Item frequencies such as these may be adequate in skill maintenance or retention, but should probably be increased in criterion exercises where acquisition of new or extended skills is assessed.

INDEPENDENT PRACTICE

The amount of independent practice on each outcome can be determined by attending to the numbers in parentheses following underlined and non-underlined page entries. Of primary interest are instances where instructional entries (regular instruction and review) are associated with fewer than ten items of independent practice. The number ten was chosen as a reference point for the analysis since many activities approached but did not exceed this number. It was reasoned that outcomes with fewer than ten items of practice, and particularly outcomes with fewer than five or six items, do not provide sufficient practice for attainment of the skill.

PRELIMINARY SPECIFICATIONS OF A LEARNING MASTERY SYSTEM APPLICATION

CONTENT STRANDS

The strands of content related to the arithmetic of whole and rational numbers are dominant. This may be inferred by inspecting the number of outcomes developed (as represented by outcome descriptors) and the number of instructional entries per outcome. Outcomes developed in these strands, as well as most of their substrands, usually include at least 10 items of independent practice. Strands such as "Applications of Mathematics" and, at earlier levels, "Number Theory", contain so many outcome descriptors in common with other strands that it is doubtful that preserving them as independent outcome areas in a Learning Mastery System would be worthwhile.

INSTRUCTIONAL OUTCOMES

Five or six broad outcomes such as the following likely will be recommended as a basic outcome structure for the development of Learning Mastery System procedures:

1. Recognize basic elements and concepts
2. Decode systems of symbols
3. Express mathematical relationships
4. Verify mathematical relationships

5. Perform operations
6. Solve verbal problems

One or more of these outcomes represent major skills to be developed in each of content domains such as the following:

I. Sets
II. Whole numbers
III. Rational numbers (positive)
IV. Integers
V. Geometry
VI. Measurement
VII. Logic

Pupil progress through broad instructional sequences for outcomes applicable to each content domain will be monitored throughout the program. At each level, a set of outcome descriptors will further refine cells in the outcome-content matrix to reflect all of the content included in the program for that level.

EVALUATION COMPONENTS

In a number of instances recognition of properties of mathematical operations is introduced through verbal instructions given by the teacher. Pupils are encouraged but not required to recognize these properties in solving related equations or problems. Acquisition of skills such as these should not be assessed in a Learning Mastery System until approximately 10 items of independent practice have been provided in a single chapter.

Several chapters contain instructional entries classified under outcome descriptors which are peripheral to major skills under development. For example, interpretation of secret codes may be used as a setting for evaluating the acquisition of number facts, but it should not be considered as an independent outcome to be developed in a major instructional sequence. The major focus in chapters such as these will be assessment of outcomes introduced and any of their prerequisites which are reviewed. In chapters where no instruction on new outcomes is begun, the principal outcomes under review will be evaluated. The context for evaluation should include settings which parallel those used during regular instruction, but they should also include some transfer settings which may be generally familiar to the pupil but not in association with the outcome under development. In general, there should not be more than two or three items of the latter type for any particular outcome developed in a chapter.

LMS evaluation components for Houghton Mifflin should include the following:

1. Four to Six Pretests for Each Level. The number of pretests will be determined by the number of major breaks in the continuity of the instructional sequence. It will not be necessary to develop a pretest for each chapter, since many follow directly from the previous chapter. Essentially, all of the information which might be of value to the teacher can be obtained from posttest or criterion exercise instruments for the previous unit. Pretests should provide a comprehensive sample of behaviors that are prerequisite to the major

skills developed in the chapter. The information obtained from the pretest should guide the teacher in determining the relative emphasis to be given any prerequisite behaviors which are reviewed prior to the introduction of new material. SWRL-developed pretests are recommended over Houghton Mifflin Placement Tests since the latter are not compatible with the unit structure in the regular instructional program.

2. En-route Assessment Devices for Each Major Outcome Introduced or Reviewed. A limited number of problems in the regular daily assignment will be identified which the teacher can review as a check on the progress of the pupil toward mastery of the outcome.

3. End-of-Unit Criterion Exercise for Each Unit. Each exercise should include at least one section for each of the major outcomes on which instruction was provided in that unit. Approximately 4-5 items should be included for each individual outcome representing material which has been introduced or extended. One or two items should be included for each descriptor where previously mastered skills have been reviewed or maintained.

Each exercise should include a limited number of problems where computational skills which have been developed are applied to the solution of verbal problems. The format for all items on the criterion exercise should be multiple choice with at least some of the distractors representing typical errors which might be made on this type of problem.

SWRL-developed instruments are recommended over existing Houghton Mifflin Diagnostic Tests for the following reasons:

(1) Houghton Mifflin Diagnostic Tests are not clearly organized around instructional outcomes.

(2) At times, Houghton Mifflin outcomes are tested at a slightly lower level than that reached during regular instruction.

(3) Many outcome-areas are evaluated with fewer than 4 items per instrument.

(4) The constructed response format used with items is incompatible with machine scoring and remedial practice based on typical errors.

PRACTICE COMPONENTS

Appropriate practice materials should be developed as part of the LMS. Wherever possible, supplementary practice should be provided in such a way that the teacher can select exercises on the basis of major types of errors committed.

SUPPORT COMPONENTS

Various support components, including a technical manual and appropriate record keeping materials will also be provided.

APPENDIX A

DESCRIPTION OF HOUGHTON MIFFLIN COMPONENTS

Houghton Mifflin has designed the set of student's texts and accompanying teacher's editions to serve as the core of the mathematics program. A number of additional components, designated by the publishers as supplementary, are available as follows:

(1) Diagnostic tests-A battery of 28 diagnostic tests, averaging 19-20 items per test, is provided for each of Levels 1-6. Two or three diagnostic tests are provided for each chapter to be used after some designated page. Four to five of the tests are cumulative and include material from several chapters. Items on all of the tests are parallel to problems provided for practice during regular instruction. Sections of each non-cumulative test are referenced to particular pages in the student's text. The teacher's edition identifies specific points in each chapter at which diagnostic tests are to be given.

(2) Duplicating Masters-A set of duplicating masters is provided for each of Levels 1-6. Approximately 60 masters are provided for Levels 1 and 2, and 80 masters for each of Levels 3-6. These masters contain 15-20 problems which are parallel to problems included in the student's text. Subsets of problems are keyed to specific pages of the text, while points where duplicating masters are to be given are designated in the teacher's edition.

(3) Workbook-A workbook for each of Levels 1-6 provides approximately 95 pages of practice problems parallel to material in the student's text. Each practice page is designated for use after a specific page in the student's text. References are included on both practice pages and corresponding pages in the teacher's edition.

(4) Programmed practice-A programmed practice book is provided for each of Levels 3-6. This book includes one page of self-directed exercises with answers for each lesson (two pages) in the student's text. The exercises contain problems which parallel problems found on corresponding pages in the student's text. Self administered chapter tests contain items which are parallel to those found in the in-book chapter tests.

(5) Placement Tests-A battery of tests designed for use prior to instruction at each level is provided. These tests sample problems from the entire level and are designed chiefly for identifying pupil strengths and weaknesses relative to placement in a non-graded program. The publisher suggests that they could also be used as end-of-year posttests for each level.

(6) Manipulative Aids-These materials include colored centimeter rods, abacus, geometric shapes, number line, and centimeter grid paper. A separate teacher's guide is available.

(7) Geoboard Kit-This includes a geoboard, rubber bands, and a set of 40 activity cards.

(8) Teaching-Learning Kit-This includes a 28" x 24" adhesive board and 376 display pieces. (Teacher's guide is included.)

(9) Concept and Skill Cards-These include 14 kits of cards suitable for class or individual use in providing extra practice.

(10) Readiness books-There is one readiness book for each of Levels 3-6. Each book includes a review of key concepts developed in the previous level.

(11) Overhead Visuals-A set of visuals had been developed for Levels 1-6 to accompany instruction on certain concepts. Approximately 25 visuals are provided for each level.

(12) Nongraded Program-A booklet is provided for adapting the regular Houghton Mifflin program to a non-graded setting.

APPENDIX B

CONTENT ANALYSIS

APPENDIX B
HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
KINDERGARTEN

CHAPTER PAGES	1 (1 - 8)		2 (9 - 16)		3 (17-26)		4 (27-38)		5 (39-53)		6 (54-78)		7 (79-94)	
I. Numbers and Numerals														
A. Numbers														
1. Recognize number as a common property of sets					19-26[1]	10[2]								
2. Identify standard sets of numbers														
Whole (cardinal) numbers to 10 (See also: Numerals)							27-38	0			63-75	0		
Ordinal numbers to fifth														
Even and odd numbers							38	0			57	0		
Fractional numbers														
--"Half" related to sets													93	4
--"Half" related to regions													94	3
3. Count members of a set to 10 (See also: Numerals)							34-38	10			63-75	10		
B. Numerals														
1. Identify name for number of elements in a set														
Given a numeral and an example set, identify second set with same number of members														
--Numerals 0							36	2			64	1		
1							27,31	3						
2							28,31	3						
3							29,31,34	5			64	1		
4							32,34	4			64	1		
5							33-4	4			64,66	2		
6											63-4,66	4		
7											65-6,70	5		
8											67,70,73	4		
9											69-70,73	5		
10											72-3	4		

[1] Numbers refer to pages in student text and corresponding pages in teacher's edition

[2] Numbers refer to number of items (up to 10) in chapter requiring independent practice on the specified outcome

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
KINDERGARTEN (continued)

CHAPTER PAGES	1 (1 - 8)	2 (9 - 16)	3 (17-26)	4 (27-38)	5 (39-53)	6 (54-78)	7 (79-94)
Given a set, identify the correct numeral							
--Sets to 0 members				37,38 2		55-7 3	
1 member				30,35,37-8 5		55-7 3	81-92 10
2 members				30,35,37-8 4		55-7 3	81-92 10
3 members				30,35,37-8 5		55-7,67 4	81-5,87-91 10
4 members				35,37-8 4		55-7,67 4	82-7,89-92 10
5 members				35,37-8 4		55-7,67, 71 5	84-7,91 9
6 members						68,71,74, 75 4	86-7, 4
7 members						68,71,74, 75 5	
8 members						68,71,74, 75 6	
9 members						71, 74-5 5	
10 members						74-5 4	
2. Write numerals for whole numbers							
0-5							
6-9							
3. Recognize names for fractional numbers							
Words ("half")							93,94 7
C. The Number-Numeral Distinction							
1. Match numeral to number of a set				27-38 10		55-57,63-75 10	
D. Ordering							
1. Order sets and numbers:							
To 5				38		55,56, 57-62 10	
To 9						76-8 10	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
KINDERGARTEN (continued)

CHAPTER PAGES	1 (1 - 8)	2 (9 - 16)	3 (17-26)	4 (27-38)	5 (39-53)	6 (54-78)	7 (79-94)
2. Recognize relational terms and symbols							
Before						59	
After						60	
Between						58	
E. The Number Line							
1. Represent order of whole numbers							
0-5						57-60 10	
F. Concrete Models for Numbers and Numerals							
1. Represent whole numbers							
Sets				27-38 10		63-75 10	81-92 10
II. Mathematical Operations							
A. Properties							
1. Intuitively recognize commutative property for addition							81 0
B. Development of Addition and Subtraction							
1. Joining sets to							
2							81,83 2
3							81,83,85 4
4							82-3,85,87 6
5							84-5,87 5
6							86-7 4
2. Separating sets, larger set to	6 3						
2							88,90 4
3							88,90,92 4
4							89-90,92 5
5							91-2 4

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
KINDERGARTEN (continued)

CHAPTER PAGES	1 (1 - 8)		2 (9 - 16)		3 (17-26)		4 (27-38)		5 (39-53)		6 (54-78)		7 (79-94)	
III. Sets														
A. Recognition														
1. Recognize set from description or roster	6	3												
Member of a set (inclusion)	7,8	6												
Common properties of sets	5-8	13												
2. Recognize relations between sets														
Subset														
Equivalence					17-8,25-6	6								
Nonequivalence					19-24	10								
Equality	5	4												
3. Recognize special sets														
Empty set							36	2			64	1		
4. Identify cardinal number property of set to 9 (See also: Numerals)							27-38	10			63-73	10	81-92	10
B. Operation														
1. Form a set of														
1-3 members					22	3					2			
4-5 members														
6-9 members														
2. Perform operations with sets														
Matching members one-to-one					17-20	10								
--Draw objects in smaller set so two sets match					22	3								
Joining sets to 6 members (See also: Addition & Subtraction)													81-87	10
Separating subset from a set --Larger set to 6 members (See also: Addition & Subtraction)													88-92	10
Compare sets identifying set with														
--More members					19,21-2	9								
--Most members					23	4								
--Fewer members					20,22	6								
--Fewest members					24	4								
--As many members as					25-6	6								

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
KINDERGARTEN (continued)

CHAPTER PAGES	1 (1 - 8)	2 (9 - 16)	3 (17-26)	4 (27-38)	5 (39-53)	6 (54-78)	7 (79-94)
IV. Problem Solving							
A. Mathematical Operations							
1. Identify picture sequence						54 2	79-80 5
2. Perform operations related to sets (See also: Sets-Operations)							
Joining							81-87 10
Separating							88-92 10
Comparing			19-24 10				
3. Identify objects which go together		11 4					
B. Mathematical Concepts							
1. Solve problems involving							
Size (larger-smaller)		12 4					
Length (longer-shorter) (See also: Measurement)		9,10 8					
V. Number Sentences							
1. Develop concepts of equality-inequality							
Comparing sets (See also: Sets)			19-24 0				
Comparing shapes and objects by size (See also: Measurement)		9-16 0					
VI. Applications of Mathematics							
1. Compare lengths of objects (See also: Measurement)		9-10 8					
2. Compare sizes of objects (See also: Measurement)		12-16 10					
3. Describe position of an object	1-3 3						
VII. Measurement							
1. Compare objects by length and size							
longest		9 4					
shortest		10 4					
largest		12 4					
smallest		13 4					
same size		14-16 9					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
KINDERGARTEN (continued)

CHAPTER PAGES	1 (1 - 8)	2 (9 - 16)	3 (17-26)	4 (27-38)	5 (39-53)	6 (54-78)	7 (79-94)
VIII. Geometry							
A. Nonmetric							
1. Recognize shapes							
Triangle					42,51-2 10		
--Side					42 0		
--Corner					42 0		
Square					48,51-2 10		
Rectangle					46,51-2 7		
Circle					40,51-2 10		
2. Recognize regions							
Triangular					43 2		
Square					49 2		
Rectangular					47 2		
Circular					41 3		
3. Identify topological concepts							
Closed curve	4				39 3		
--Points on							
--Points inside - outside	4				39 3		
4. Identify positional terms							
On	3 1						
Above	1 1						
Below	2 1						
Inside-outside	4 3				39 3		
B. Metric							
1. Identify one-half of a region							94 3
IX. Logical Thinking							
1. Recognize chronological sequence						54 2	79.80 5
2. Recognize geometric pattern					44-5,50, 53 10		
3. Compare							
Lengths		9-10 8					
Sets			19-24 10				
Shapes					42-53 10		
Sizes		12-13 8					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
KINDERGARTEN (continued)

CHAPTER PAGES	1 (1 - 8)	2 (9 - 16)	3 (17-26)	4 (27-38)	5 (39-53)	6 (54-78)	7 (79-94)
X. Number Theory							
1. Recognize odd and even numbers							

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1

CHAPTER PAGES	1 1 - 30	2 31 - 60	3 61 - 92	4 93 - 124	5 125 - 156
I. Numbers and Numerals					
A. Numbers					
1. Recognize whole (cardinal) numbers					
To 9	13-21,23-5 (10)[3] 2(9)[4]	31-40(10)			125-127(5)
To 99				94-8,100-101(10) 9(4)	125-128(10)
To 399 *					
To 999					
2. Identify special concepts related to whole numbers					
Ordinal number					
Even and odd numbers					
Identity element					
--Zero (addition)			72(3)		
Number patterns	(See IX - 3)				
3. Recognize fractional numbers					
One-fourth (sets)					
One-fourth (regions)					
One-half (sets)					
One-half (regions)				117-118(10)	

---

[3] Numbers in parentheses refer to number of items in chapter requiring independent practice.

[4] Underlined numbers refer to pages and corresponding items in student workbook.

*Underlined content descriptors represent outcomes introduced for the first time in the program.

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	1 1 - 30	2 31 - 60	3 61 - 92	4 93 - 124	5 125 - 156
B. Numerals					
1. Identify name for number of elements in a set					
Match set to given numeral					
--Numerals 0	22(2) 8(1)				
1	13(2) 8(1)				
2	14(2) 8(1)				
3	15(2) 8(1)				
4	16(2) 8(1)				
5	21(2) 8(1)				
6		31(2)			
7		33(2)			
8		35(2)			
9		37(2)			
10		39(2)			
Match numeral to given set					
--Sets to 0 members	26(1)	45(1) 11(1)			
1 member	17-8,26-7,30(6)	45(1)			
2 members	17-8,26-7,30(7)	45(1) DT6(1)[5]			
3 members	17-8,26-7,30(6)	45(1) 11(1)/DT6(1)			
4 members	17-8,26-7,30(7)	45(1) 11(1)/DT6(1)			
5 members	26-7,30(3)	45(1) DT3,6(2)			
6 members		45(1) 11(1)/DT3,6(2)			
7 members		45(1) 11(1)/DT3,6(2)			
8 members		45 (1) 11(1)/DT3(1)			

---

[5] Numbers preceded by DT refer to individual tests in the battery of Diagnostic Tests and the number of items. DT6(1) refers to one item on Diagnostic Test 3.

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER	1	2	3	4	5
PAGES	1 - 30	31 - 60	61 - 92	93 - 124	125 - 156
9 members		45(1) 11(1)/DT3(1)[4]			
10 members		45(1) 11(1)/DT3(1)			
Write numeral for given set					
--Sets to 0 members	23-5,28-9(5)	32,40(2)			
1 member	19-20,23-5,28-9 (9)	38,46(2)			
2 members	19-20,23-5,28-9 (8)	32,38,46(3)			
3 members	19-20,23-5,28-9 (10)	32,34,36,38,40,46(6)			
4 members	19-20,23-5,28-9 (9)	32,34,36,38,40,46(6)			
5 members	23-5,28-9(5)	32,34,36,38,40,46(6)			
6 members		32,34,36,38,40,46(6)			
7 members		34,38,40,46(4)			
8 members		36,38,40,46(4)			
9 members		38,40,46(3)			
10 members		40,46(2)			

---

[5] Numbers preceded by DT refer to individual tests in the battery of Diagnostic Tests and the number of items. DT3(1) refers to one item on Diagnostic Test 3.

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	1 1 - 30	2 31 - 60	3 61 - 92	4 93 - 124	5 125 - 156
2. Read numerals for whole numbers					
Compact form	(See I-A - 1)				
--Two digits					
---Three digits to 399					
Expanded form	(See II-C - 3)				
--Two digits					
--Three digits to 399					
3. Write numerals for whole numbers (practice in writing digits)	13-6,21-2,19-20, 23-4(10) 7,9(7)	31-40(10) 10(6)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	1 1 - 30	2 31 - 60	3 61 - 92	4 93 - 124	5 125 - 156
4. Recognize numerals for fractional numbers					
Words ("half", etc.)				117-118(10) 36(8)	
a/b form					
5. State the place value of a digit					
To tens				94-6(10)	125-128(10)
To hundreds					131,155(10)
C. The Number-Numeral Distinction					
1. Match numeral to number of a set	13-8,21-2,26-7 (10)	31,33,35,37,39,45, 47,48,51,52(10) DT4(1)	65-6,69-70, 77-8(10)	95-8(10)	
2. Identify more than one name for same number using an equation			77-8,86(10) 24,27(10)/DT8(1)	100(10) 31(3)	
3. Rename addends and sums					
Addition (missing sum)			77-8,86(10)		
Subtraction (missing addend)					
D. Ordering					
1. Order 3 or more whole numbers in a counting sequence					
By ones to 9	25-6(2) 8,9(1)/DT2(1)	45-6,60(4) 13,19(10)			
99				101(2)	125-127,132(10) 41(10)/DT12(6)
399					
By tens to 99					
399					39,47(3)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGFS	1 1 - 30	2 31 - 60	3 61 - 92	4 93 - 124	5 125 - 156
2. Order whole numbers using relational terms and symbols					
Between					133(9)
Greater		57-9(10)		107(5)	
Less		41-2,57-9,(10) 12(5)		107(5)	
One greater than					133-134(9)
One less than					133-134(9)
Two less than					
<		43-4,57,59-60(10) 17(4)/DT5,6(5)	91(5)	107(4) 33(5)/DT10(2)	133-134 (10) 47(4)
>		57-60(10) 17(4)/DT5,6(4)	91(2)	107-8(9) 33(5)/DT10(2)	133-134(9) 47(5)
=		51-52(7)	91(9)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	1 1 - 30	2 31 - 60	3 61 - 92	4 93 - 124	5 125 - 156
E. The Number Line					
1. Represent order of whole numbers	27 (1) 9(2)	45,60(3)	20(10)	101-102(3) 31,38(4)/DT9(1)	DT14(1)
2. Represent relations					
One more				103-104(10) 32(9)	
Two more				105-106(10) 32(4)	
3. Identify directions					
Left-right				107(8)	
4. Represent operations					
Addition					
--Sums to 5			64,83-4(10)	124(2)	
6,7			25(5)		147(7) 45(8)
10					
11					
12					
13					
14					
15					
16					
17					
18				38(10)	
--Three addends					
Subtraction			83-84,75-76(10)		147(4)
Inverse operations					
--Addition-subtraction					
5. Use vertical number line		46(1)			
F. Concrete Models for Numbers and Numerals					
1. Represent whole numbers and place value					
Structured bundles				94-96(10)	127-128(10)
Abacus					130-131,155(7)
Number rods	13-16,21(5)	31-3,-5,-7,-9, 46(6)	63(10)	97-98,124(10)	125(4)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER	1	2	3	4	5
PAGES	1 - 30	31 - 60	61 - 92	93 - 124	125 - 156
2. Represent fractional numbers					
Sets-subsets					
Regions-subregions				117-118(10)	
3. Represent relations on numbers					
II. Mathematical Operations					
A. Properties					
1. Recognize properties of mathematical operations					
Associativity of addition					
Commutativity of addition			80(1) 61,63(10) 20(10)		145-147(0) 151,153(6)
Additive identity-zero			72(3)		
Inverse operations: Addition-subtraction			79(6) 25,26(10)		
--Sums of 4			80-85(10)	111(2)	139-140,145-146 (10)
5				112(4)	
6					145-146,147-148 (10)
7					151-152,154(10)
8					
9					
10				93(4)	
B. Development of Addition and Subtraction					
1. Recognize related terms					
Addend		51,55(7)	69(3)		
Sum		51-53(10)	62(8)		
Missing addend		55-56(10) 16(4)/DT5(3)			
2. Recall basic facts					
Sums to 4		53-56(10) 18(10)/DT5(6)	62-64,71-72,79, (10)		
5			73-76,79,80-86, 92(10) 23,26(10)/DT7(6)	109-110,112,123 (10)	139,141-142(10) 44(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	1 1 - 30	2 31 - 60	3 61 - 92	4 93 - 124	5 125 - 156
--Sums of 6,7					145-146,148-155(10) 46(16)
8,9,10					
11,12					
13					
14-18				101(10)	
Families of facts			62-63(10)		145,149(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	1 1 - 30	2 31 - 60	3 61 - 92	4 93 - 124	5 125 - 156
3. Recognize models for addition					
Union (joining two sets)					155(2)
Number rods					155(2)
Abacus					
4. Add whole numbers to two places					
One addend less than ten					
Tens					
Tens and ones				94(9)	47(4) 131(10) 40,47(12)
--No renaming					
Three addends					
5. Recognize models for subtraction					140,177(10) 43(25)
Separation of subset from set					
Number rods					
Abacus		55-6,62-3(10)			
Missing addend					
6. Subtract with whole numbers to two places					
One addend less than ten					
Tens					
Tens and ones					
--No renaming					
C. Addition and Subtraction Algorisms					
1. Use counting algorism	(See I-A - 1)				
2. Use horizontal-form algorism					
Equations		53-6(10)	71-5(10)		DT12,14(10)
3. Use vertical-form algorisms				111-112(10) 34,35(10)/DT10(5)	141-142,148(10) 44(25)
Expanded numerals					
Working (short) form					DT13(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER	1	2	3	4	5
PAGES	1 - 30	31 - 60	61 - 92	93 - 124	125 - 156
4. Use algorisms with number wheels Addition Subtraction					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER	1	2	3	4	5
PAGES	1 - 30	31 - 60	61 - 92	93 - 124	125 - 156
D. Extensions					
1. Translate a secret code					
Addition	(See IX - 4)				156(4)
Subtraction					156(4)
III. Sets					
A. Recognition					
1. Recognize set from description or roster					
Member of a set (inclusion)	5-6 (6) 2(3)/DT1(3)				
2. Recognize relations between sets					
Subset	5-6(6)				
Equivalence	9-10				
Nonequivalence	11-12				
3. Recognize special sets					
Empty set	22,32(3)				
4. Identify cardinal number property of sets to 18					
Sets of 1-4	13-18(10) DT2(3)				143-144(6)
0,5-10			61-2(10)		149-150,153 (10)
11-18					
B. Operation					
1. Perform operations with sets					
Matching members					
--One to one	7-12,26(10) 2,3(5)/DT1(2)	41-2(8)			
--One to many		47-50(10)	87,93(10)	99(6)	
Joining sets					
--To 6		47-50(10)			135(6)
--To 18					149,151-152(10)
Separate subsets from set					
--Larger set to 6			65-9,72-4(10)		
--Larger set to 18					135-136(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OBJECTIVES
GRADE 1 (continued)

CHAPTER PAGES	1 1 - 30	2 31 - 60	3 61 - 92	4 93 - 124	5 125 - 136
Comparing sets to 18	11-12(6) 4(4)	41-4,57-60(10) DT3(3)			
Order sets by number of elements					
--To 5	25,27(2)				
--To 18		45(1)			
2. Recognize properties of set operations					
Associativity of union	(See II A-1)				
Commutativity of union	(See II A-1)				
3. Relate set operations to operations on numbers					
Joining sets					
--Addition		47-50(10) 14,19(10)/DT4(3)			135-136(10)
Separating sets					
--Subtraction			65-8,72-4(10) 21,22(10)/DT7(2)		
IV. Problem Solving					
A. Mathematical Operations					
1. Complete number sentence associated with word-picture (rebus) problem	25,28-9(10)		29(4)		137-138(10) 42(8)
2. Perform operations related to sets					
Joining		47-50(10)			135(6) DT13(1)
Separating					135-136(10) DT13(1)
Comparing		43,57-9(10) DT6(2)	65-9,72-4(10)	108(5)	
B. Mathematical Concepts					
1. Solve verbal problems involving					
Money					
Time				119-122(10) 37(10)	

HOUGHTON MIFFLIN INSTRUCTIONAL OBJECTIVES
GRADE 1 (continued)

CHAPTER PAGES	1 1 - 30	2 31 - 60	3 61 - 92	4 93 - 124	5 125 - 136
V. Number Sentences 1. Write number sentence to describe word and picture problems		53-54(9) 15(4)	70-71(8)		
2. Develop concepts of equality-nonequality by comparing sets		43-4, 57-60(10)		107,113-114(10)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	1 1 - 30	2 31 - 60	3 61 - 92	4 93 - 124	5 125 - 156
3. Recognize related terms					
More than		57-9(10)		107(4)	133(7)
Less than		41-42(8)		107(4)	133(7)
One more				103-104(10) DT10(6)	
4. Complete sentences using symbols					
<		59-60(9)	91(5)	107(4)	134(10)
>		59-60(8)	91(2)	107(4)	134(9)
=			91(9)		
+				110(7)	140(7)
-				110(7)	140(10)
5. Decode sentences with symbols					
> <	(See I-D, V - 2)	43-4,57-8(10)			
=	(See II-A)				
+,-	(See II-A)	51-60(10)			
( )	(See II-A)				
6. Use ( ) to show associativity	(See VII - 1)				
7. Recall families of facts Addition-subtraction					146,153(10)
8. Read-write sentences related to					
Capacity					
Money					
VI. Applications of Mathematics					
1. Apply mathematical concepts and skills to					
Capacity (liquid)					
Time				119-122,124(10)	
Money				124(1)	

HOUGHTON MIFFLI INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	1 1 - 30	2 31 - 60	3 61 - 92	4 93 - 124	5 125 - 156
VII. Measurement					
1. Recognize and use systems of measurement					
Capacity					
--Cup					
--Pint					
--Quart					
Time					
--Half hour				121-122(10)	
--Hour				119-120(10)	
				DT11(3)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	1 1 - 30	2 31 - 60	3 61 - 92	4 93 - 124	5 125 - 156
Money					
--Pennies and dimes				99(6) 30(7)	129(8)
--Pennies and nickles			87-8(8) 28(7)/DT8(4)		
--Pennies, nickels, and dimes				108(5)	
--To 4 cents			89(4)		
--To 5 cents			90(4)		
--¢ designation			88(4)		
Length					
--Inch				124,115-116(10)	
--Centimeter					
--Rounding (nearest inch)				115-116(9)	
Estimation					
--Nearer				113-114(8) DT11(2)	
--Nearest					
VIII. Geometry					
A. Nonmetric					
1. Recognize geometric shapes					
Triangle					
Square					
Rectangle					
Circle					
2. Recognize regions					
Triangular					
Square					
Rectangular					
Circular					
3. Identify topological concepts					
Curve (not closed)					
Closed curve					
4. Recognize relations and properties					
Symmetry (shapes)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	1 1 - 30	2 31 - 60	3 61 - 92	4 93 - 124	5 125 - 156
B. Metric					
1. Describe fractional parts of region and segments					
One-half				117-118(10) DT11(6)	
One-fourth					
IX. Logical Thinking					
1. Relate the members of a subset to a set with an "if-then" statement					
2. Arrange events chronologically	1-4(7) 1(4)				
3. Recognize number patterns				96,98,100,103-106(7)	128(1)
4. Interpret a secret code (numbers)					156(4) 48(10)
X. Functions and Graphs					
1. Interpret simple bar graph					
2. Represent data by simple bar graph					
XI. Probability and Statistics					
1. Interpret simple bar graphs	(See X - 1,2)				
2. Represent data by simple bar graphs	(See X - 1,2)				
XII. Number Theory					
1. Recognize odd and even numbers					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
I. Numbers and Numerals					
A. Numbers					
1. Recognize whole (cardinal) numbers					
To 9					
To 99			221-223 (10)		
To 399			240-242 (4)		
To 999			244-248(10)		
2. Identify special concepts related to whole numbers					
Ordinal number					307-308(3) 91(5)
Even and odd numbers					301-304(10)
Identity element					
--Zero (addition)					
Number patterns					
3. Recognize fractional numbers					
One-fourth (sets)		207(4)			309-310(5)
One-fourth (regions)					309-310(6)
One-half (sets)		207-208(10)			
One-half (regions		205-206(10)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
B. Numerals					
1. Identify name for number of elements in a set					
Match set to given numeral					
--Numerals 0					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
Match numeral to given set					
--Sets to 0 members					
1 member					
2 members					
3 members					
4 members					
5 members					
6 members					
7 members					
8 members					
9 members					
10 members					
Write numeral for given set					
--Sets to 0 members					
1 member					
2 members					
3 members					
4 members					
5 members					
6 members					
7 members					
8 members					
9 members					
10 members					

LMS MATH

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
2. Read numerals for whole numbers					
Compact form					
--Two digits					
--Three digits to 399					
Expanded form					
--Two digits					
--Three digits to 399					
3. Write numerals for whole numbers (practice in writing digits)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
4. Recognize numerals for fractional numbers					
Words ("half", etc.)		205-209(10)			
a/b form					309-310(10) 94(2)
5. State the place value of a digit					
To tens			221-222,227(10) 68(8)		
To hundreds			239,243-244(10)		
C. The Number-Numeral Distinction					
1. Match numeral to number of a set		207-208(10)			301,309-310(10)
2. Identify more than one name for same number using an equation			242,250(10) 76(8)/DT22(9)		290-291,299, 315(10)
3. Rename addends and sums					
Addition (missing sum)					
Subtraction (missing addend)					
D. Ordering					
1. Order 3 or more whole numbers in a counting sequence					
By ones to 9			221,231(2)		
99			229,231,252(7) 69(1)/DT20(3)		302,304-306, 315 (7)
399			247-248,252(10) 72,75(10)/DT22(2)		
By tens to 99			221(2)		
399			240-242,248(7) 21(3)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
2. Order whole numbers using relational terms and symbols					
Between					
Greater					
Less					
One greater than			230(7)		
One less than			230(7)		
Two less than			230(7)		
<	177(5)		232,249(10) 77(4)		289,292(10) 94(2)
>	177(3)	67(3)	249(8) 77(2)		292,289(10) 94(1)
=					292(6)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
E. The Number Line					
1. Represent order of whole numbers			221,228-231,240- 242,248(10)		
2. Represent relations					
One more					
Two more					
3. Identify directions					
Left-right					
4. Represent operations					
Addition					
--Sums to 5					
6,7	159-160(10)			81(7)	
10	185,187(10)			81(2)	
11		67(10)		81(7) 261-2(10)	
12				80,81(5) 267-268(10)	
13				80,81(6) 279-280(10)	
14					286(10)
15					288,293(10)
16					296(6)
17					297(1)
18					298(1)
--Three addends				261,267,279(10)	286,293(10)
Subtraction	187(10)	213-214(10)		262,268,280(10)	296-298(4)
Inverse operations	160(8)				
--Addition-subtraction				262(2)	296-298(4)
5. Use vertical number line		213-214(10)			
F. Concrete Models for Numbers and Numerals					
1. Represent whole numbers and place value					
Structured bundles			221-222(5)		
Abacus			223-224,227,236, 243(10)	255,275(8)	
Number rods			68(8)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
2. Represent fractional numbers					
Sets-subsets		207-208(10)			309-310(5)
Regions-subregions		205-206(10)			309-310(6)
3. Represent relations on numbers					
Equality-number rods					
Inequality-number rods					
II. Mathematical Operations					
A. Properties					
1. Recognize properties of mathematical operations					
Associativity of addition	163-164(10) 178,187(10)		77(8)	267,279(6)	286(3)
Commutativity of addition	167(1)			259,265,277(10)	285,287,295-297(10)
Additive identity-zero					
Inverse operations:					
Addition-subtraction	174,182(10) DT16(3)			262(2)	296-298(4)
--Sums of 4					
5					
6					
7					
8	168(6)				
9	173-174(10)				
10	181-182(10)				
B. Development of Addition and Subtraction					
1. Recognize related terms					
Addend			235-238(10)		
Sum					
Missing addend					
2. Recall basic facts					
Sums to 4					
5					
Sums of 6,7	157-163(10) 49,50(10)/DT15(10)			271-272(10)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
Sums of 3,9,10	167-168,170,173-176 181-188(10) 52,53,55-57(10)/DT16,17(10)			270(6) 86(3)	
11,12				259-261,263, 266-269(10) 80,85(10)/DT24(10)	88(8)
13				278-280(10) DT25(10)	88(3)/DT26,27 (10)
14-18					285-288,295- 299(10) 87,89(10)/DT26 (10)
Families of facts					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
3. Recognize models for addition					
Union (joining two sets)					
Number rods					
Abacus			227,243-245(10)		
4. Add whole numbers to two places	188(10)		233,251-252(10)	254-258,273-275, 283(10)	
One addend less than ten					315(6)
Tens			221-223,233-238 (10)	274,257-258(10)	
Tens and ones			224,225-227(10) 68,73(10)/DT20(3)	273-274(10)	
--No renaming					
Three addends	161-164,178,187 (10) 51(10)		252(6) DT22(2)	86(3)/DT23(10)	286,293-294, 311(10) 92(10)
5. Recognize models for subtraction					
Separation of subset from set					
Number rods					
Abacus					
Missing addend				82(15)	
6. Subtract with whole numbers to two places	188(6)			283(6)	
One addend less than ten					
Tens				222-224,233-238(10)	
Tens and ones			224(10)	255-258(10) 78(4)	
--No renaming				275-276(10)	
C. Addition and Subtraction Algorisms					
1. Use counting algorism					
2. Use horizontal-form algorism					94(6)/DT28(9)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
3. Use vertical-form algorisms	158,163,170,178 (10)		233-238,235(10)	273-274,255(10) 84(10)	
Expanded numerals			239,243-246(10) 70,74(10)/DT21(2)	283(2)	
Working (short) form			236,256(10) 70(10)/DT21(5)	256 79,83(10) DT24,25(10)	94(8)/DT28(10)
4. Use algorisms with number wheels					
Addition				281(2)	
Subtraction				282(2)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
D. Extensions					
1. Translate a secret code					
Addition					316(4)
Subtraction					
III. Sets					
A. Recognition					
1. Recognize set from description or roster					
Member of a set (inclusion)					
2. Recognize relations between sets					
Subset		199-200(4)			
Equivalence					
Nonequivalence					
3. Recognize special sets					
Empty set					
4. Identify cardinal number property of sets to 18					
Sets of 1-4					
0, 5-10	157,165-168,171-172, 179-180(10)				
11-18				265,277(10)	
B. Operation					
1. Perform operations with sets					
Matching members					
--One to one		209(6)			
--One to many					
Joining sets					
--To 6					
--To 18	162-163,165,167-168, 171,173-174,179-182 (10)				
Separate subsets from set					
--Larger set to 6					
--Larger set to 18					

HOUGHTON MIFFLIN INSTRUCTIONAL OBJECTIVES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
Comparing sets to 18					
Order sets by number of elements					
--To 5					
--To 18					
2. Recognize properties of set operations					
Associativity of union					
Commutativity of union					
3. Relate set operations to operations on numbers					
Joining sets					
--Addition	166,180(10)				
Separating sets					
--Subtraction					
IV. Problem Solving					
A. Mathematical Operations					
1. Complete number sentence associated with word-picture (rebus) problem	186(9)	201-202(10) 62(8)	238,250(10) 71(3)	264,270,272,284 (10)	294,300(10)
2. Perform operations related to sets					
Joining					
Separating				271-272(10)	
Comparing			75(6)		
B. Mathematical Concepts					
1. Solve verbal problems involving					
Money	184(6) 57(2)/DT17(3)	DT18(2)		272(7) 79,83(6)	
Time					67(3)

HOUGHTON MIFFLIN INSTRUCTIONAL OBJECTIVES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
V. Number Sentences					
1. Write number sentence to describe word and picture problems	186(9)				
2. Develop concepts of equality-nonequality by comparing sets	54,57(10)				289(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
3. Recognize related terms					
More than			232,249(10)		289,292(5)
Less than			232,249(10)		289,292(5)
One more					
4. Complete sentences using symbols					
<	177(5)		232,249(10)		289(5)
>	177(3)		232,249(10)		289(5)
=					
+	177(5)				289(4)
-	177(7)				289(6)
5. Decode sentences with symbols					
> <					
=					
+,-					
( )					
6. Use ( ) to show associativity	187(3)			267,279(6)	
7. Recall families of facts				259,265,277(10)	285,287,295-298(10)
Addition-subtraction					
8. Read-write sentences related to					
Capacity					
Money			225,233(7)	253-254(9)	
VI. Applications of Mathematics					
1. Apply mathematical concepts and skill to					
Capacity (liquid)		210-212(10)			
Time					
Money	184(6)		251(6)	254(3)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
VII. Measurement					
1. Recognize and use systems of measurement					
Capacity					
--Cup		210(6) 65(3)/DT19(1)			
--Pint		210-212,219(10) 65(5)/DT19(1)			
--Quart		211-212,219(10) 65(3)/DT19(1)			
Time					
--Half hour					
--Hour					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
Money			225(6)		
--Pennies and dimes			223(2)	253(10)	
--Pennies and nickles					
--Pennies, nickels, and dimes	184(6)				
--To 4 cents					
--To 5 cents					
--¢ designation					
Length					
--Inch					
--Centimeter		220(6)			
--Rounding (nearest inch)					314(5)
Estimation					
--Nearer					
--Nearest					93(10) 313-314(10)
VIII. Geometry					
A. Nonmetric					
1. Recognize geometric shapes					
Triangle		193,195,219(8) 59,60(5)		DT23(1)	94(1)
Square		194-196,219(8) 59,60(3)		DT23(1)	94(1)
Rectangle		193,195,219(8) 59,60(7)			94(1)
Circle		194-196,219(7) 59,60(9)		DT23(1)	94(1)
2. Recognize regions					
Triangular		192-193(4) 59(3)			
Square		192,194(4) 59(1)			
Rectangular		192-193(4) 59(5)			
Circular		192,194(4) 59(7)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
3. Identify topological concepts					
Curve (not closed)		189,195(10)			
Closed curve		190-191(10)			
		58(10)/DT18(4)		86(4)	
4. Recognize relations and properties					
Symmetry (shapes)		203-204(8)			
		63(5)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 1 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316
B. Metric					
1. Describe fractional parts of regions and segments					
One-half		205-206(10) 64(4)/DT19(6)		DT23(3)	
One-fourth		219(2)			309-310(10) 91(4)/DT27(4)
IX. Logical Thinking					
1. Relate the members of a subset to a set with an "if-then"statement		197-199(10) 61(4)/DT18(1)			291-292(10)
2. Arrange events chronologically					315(1)
3. Recognize number patterns			230(3)		302,304,312(6)
4. Interpret a secret code (numbers)				81(1)	316(4)
X. Functions and Graphs					
1. Interpret simple bar graphs		215-217(10) 66(1)			
2. Represent data by simple bar graph		216-217(10) 66(1)			
XI. Probability and Statistics					
1. Interpret simple bar graphs		215-217(10)			
2. Represent data by simple bar graphs		216-217(10)			
XII. Number Theory					
1. Recognize odd and even numbers					301-304(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2

CHAPTER	1	2	3	4	5
PAGES	1 - 28	29 - 60	61 - 92	93 - 124	125 - 156
I. Numbers and Numerals					
A. Numbers					
1. Recognize whole (cardinal) numbers					
To 9	3-8(10)	35,37,41,44(10)			
To 99				93-98,103,105, 113,124(10)	129,135,137(10)
To 999					
2. Identify special concepts related to whole numbers					
Ordinal number	13-14(10) 4(10)/DT11(4)		28(4)		
Even and odd numbers					
Number pair	(See X - 1)				
Identity element	(See II-A - 1)				
--Zero (addition)					
--One (multiplication)					
Number patterns					
--Addition	(See II-D - 4)				
--Multiplication	(See II-E - 4)				
3. Recognize fractional numbers					
One-fourth (sets)					
One-fourth (regions)					
One-fourth (measurement)					
One-half (sets)			77-8(10) 24(6)/DT8(3)		DT14(3)
One-half (regions)					
One-half (measurement)					
One-third (sets)					
One-third (regions)					
Three-fourths (sets)					
Three-fourths (regions)					
Two-thirds (sets)					
Two-thirds (regions)					
Numbers greater than 1			79-81(6)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
B. Numerals					
1. Read numerals for whole numbers to 999					
Compact form				93-8(10)	
Expanded form				95-7(10) 30(10)/DT9(3)	
2. Write numerals for whole numbers (practice in writing digits)	3-4(10) 3(10)				
3. Recognize numerals for fractional numbers					
Words ("half", etc.)			77-8(10) 24(6)/DT8(3)		
a/b form			79-81(10)		
Mixed numeral form			81-2(4)		DT14(3)
4. State the place value of a digit					
To tens				93-98(10) 29(3)	
To hundreds					
C. Number-Numeral Distinction					
1. Identify more than one name for same number: Equations	8-9(10)/DT6(8) 25-27 (See also outcomes for all mathematical operations)			120-122(10)	
2. Rename addends and sums	(See outcomes for adding and subtracting numbers, II-B 1,2,4,and 6 and II-D 2,3)				
3. Rename factors and products	(See outcomes for multiplication, II-C 1,2)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
D. Ordering					
1. Order 3 or more whole numbers in a counting sequence					
By ones to 9	11-2,28(10) DT1(1)				
99				99-100(10) 31(10)/DT9(2)	
999					
By tens to 99				DT9(1)	
999					
By hundreds to 999					
By twos, threes and fives					
2. Order whole numbers using relational terms and symbols					
Greater than(>), less than(<), equal(=)	7-10,12,27-8(10) 2(10)/DT1(3)	52(10) DT6(3)	25(6)	29(8)	
Before				100(8)	
After				100(8)	
Between	11(10)			100(4)	
3. Order fractional numbers			79-81(1) 24(1)		
E. The Number Line					
1. Represent order of whole numbers	11,12,28(10) 3(6)/DT1(1)			99(10)	
Even and odd numbers					
2. Represent order of fractional numbers			80-81(10)		
3. Represent relations Before, after, between	11(0)		69(10)	100(10)	
4. Identify directions Left-right	12(7)	47,49(10)		29(7)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
5. Represent operations					
Addition		47-8(10) 13,15(9)/DT5(1)		107-109,115(10) 32-3(10)	148(9) 45,47(6)
Subtraction		49-50(10) 13,15(10)/DT5(2)		109(5)	152(10) 45(5)
Multiplication					
Inverse operations --Addition-subtraction					
6. Use vertical number line					
7. Represent properties - associativity of addition				107-108,115(10)	131,136,138, 143(10)
8. Represent measurement			65-6,69,80-1(10)		
F. Concrete Models for Numbers and Numerals					
1. Represent whole numbers	(See also II-B - 3,5; Mathematical Operations - Addition and subtraction)				
Abacus				97-8(10) 30(6)	
Structured sets and bundles				93-6(10)	
Number rods				103,105,113,124 (10)	129,135,137(10)
Place-value chart		35,37,41,44(10)		95(5)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
2. Represent fractional numbers					
Sets-subsets	(See I-A - 3)				
Regions-subregions	(See I-A - 3)				
3. Represent relations on numbers					
Equality-inequality (number rods)	7-8,10(10)				
II. Mathematical Operations					
A. Properties					
1. Recognize properties of mathematical operations					
Associativity					
--Addition		31-4,40,46(0)		107-108,115(0)	127-128,131, 136,138,143, 147,149(7) 40(0)
Commutativity					
--Addition	18(0)	30,39,45(0)		116(0)	126,134,140,(0) 39(6)/DT12(2)
--Multiplication					
Identity elements					
--Zero (addition)					
--One (multiplication)					
	93(7)				
Zero as a factor	(See II-C - 1)				
Inverse operations					
--Addition-subtraction		29(0)			
B. Development of Addition and Subtraction					
1. Identify terms and related components					
"Addend"	16,20(0)				
"Sum"	16,20(0)				
2. Recall basic facts					
Sums through 6	15-24(10) 5,6-9(10)/DT2-3(10)				
7		35-6(10)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
Sums through 8		37-8(10) 11,12(10)/DT3(6)			
9		41-2(10)			
10		43-4(10)			
11		13-14(10)/DT4,6(10)	28(6)	DT9(10) 103-104(10)	
12				32-33(10) 105-106(10)	
13				32-33(10)/DT10(10) 113-114(10) 35(9)/DT11(10)	

69

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
14					129-130(10) 41(10)/DT12, 14(10)
15					135-136(10) 42(10)/DT12(6)
16					137-138(10) 43(10)
17					143-144(10) 45(5)
18					143-144(10) 45(4)/DT13(6)
One as an addend					
Families of facts	8(4)	30,39,45(10) 10(6)/DT4(2)	28(3)	116(4) 28(5)	134,140(4) 42(2)/DT12(2)
3. Recognize models for addition					
Union (joining two sets)	15-8,23(10) 5(10)/DT2(2)	29(4) 11(8)			147(3) 43(2)
Number rods		32,34-5,37,41-3 (10)		103,105,113(0)	129,135,137(0)
Abacus					147(1)
4. Add whole numbers to three places					
One addend greater than ten					
--No renaming					147-150(10) DT13(6)
--Renaming					
Tens					
Tens and ones					
--No renaming					
Renaming ones as tens					
Hundreds, tens, and ones					
--No renaming					
Three or more addends		31-4(10) 10(3)/DT3(2)	92(7) 23(6)	118(10) 36(10)/DT11(6)	127-128(10) 40(12)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
5. Recognize models for subtraction					
Separation of subset from set	19-22,24,25(10) 6-7(10)/DT2(2)	29(4)			151(3) 43,48(3)
Number rods		35,37,41,43(10)		103,105,113(10)	129,135(10)
Abacus					
Missing addend(introduction)	20(8) 5-7(10)/DT2(9)				151(1)
6. Subtract with whole numbers to three places					
One place number from two place number					
--No renaming					151-154(10) DT13(6)
--Renaming					
Tens					
Tens and ones					
--No renaming					
--Renaming tens as ones					
Hundreds					
Hundreds, tens, and ones					
--No renaming					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
C. Development of Multiplication					
1. Recall basic facts					
0 as a factor					
1 as a factor					
2 as a factor					
3 as a factor					
5 as a factor					
2. Recognize model for multiplication					
Addition-equal addends					
Set of equivalent sets					
D. Addition and Subtraction Algorisms					
1. Use counting algorism	15-23,25(10) 5,6-7(10)	29(8) 17(7)			147,151(6)
2. Use horizontal-form algorism					
Equations	15-6,19-20(10) 5-6(10)/DT2(3)	31-2(10) 15(10)/DT3(4)			147-150(10) 40,47,48(10)
3. Use vertical-form algorism					
Expanded numerals					
Column diagrams					
Three-step method					
Four-step method					
Working (short)form	23-4(10) 7-9(10)	33-4(10) DT3,4,6(10)	23(10)	DT9,10(10)	150,154(10) 47,48(10) DT11-14(10)
4. Use algorisms with Sets of ordered pairs (functions)					
--Addition		51(10) 16(10)		110,124(10)	144-145(10) 39,46(10)
--Subtraction		51(10) 16(7)		110(5)	
Number patterns					
--Addition		40,46,51(8) 16(10)		110,124(10)	144-145(9) 39,46(10)
--Subtraction		51(2) 16(7)		110(1)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
Number wheels					
--Addition					
--Subtraction					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
E. Multiplication Algorism					
1. Use skip counting algorism (counting by twos, threes, etc.)					
2. Use horizontal-form algorism Equations					
3. Use vertical-working-form algorism					
4. Use algorism with	(See X - 1)				
Ordered pairs (functions)					
Number patterns					
F. Extensions					
1. Translate a secret code					
Addition-subtraction				101-102(10)	132(3)
Multiplication					
III. Sets					
A. Recognition					
1. Recognize set from description or roster					
Member of a set (inclusion)					
Brace notation					
2. Recognize relations between sets					
Subset	19-22(10) 6-7(10)		77-78(10) 24(6)		
Equivalence	2-3(4) 1(2)/DT1(2)		77-78(10) 24(6)		
Nonequivalence	5-9(4)				
Equality					
3. Recognize special sets					
Empty set					
Sets of ordered pairs (functions)	(See X - 1)				
Set of equivalent subsets			77-78(10) 24(6)/DT8(3)		45(1)
4. Identify cardinal number property of sets to 18	3-6(10)	17(10)		93-6(8) 35(5)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
B. Operations					
1. Perform operations with sets					
Matching members					
--One to one	1-3,5-9(10) 1(2)/DT1(2)	53-4(0)			
--One to many (rates)			85-8(8) 27(3)		
Joining sets (union)	(See II-B - 3, C - 2)				
Separating subsets from set	(See II-B - 5)				
Comparing sets	5-9(10)	53-4(10)			
2. Recognize properties of set operations					
Associativity of union		31-2(0)			147(0)
Commutativity of union	18(6)				39(2)
3. Relate set operations to operations on numbers					
Joining sets	(See II-B - 3, C - 2)				
--Addition					
--Multiplication					
Separating sets	(See II-B - 5)				
--Subtraction					
IV. Problem Solving					
A. Mathematical Operations					
1. Complete number sentence associated with word-picture problems		55-6(10)	76(2)	111-112,117(10) DT10(4)	125,133,139, 142,146,155(10) 34(4)/DT13(2)
2. Perform operations related to sets	(See III-B - 1)				
Joining					
Separating					
Comparing					
3. Solve verbal problems involving					
Addition-subtraction		55-6,58,59(10)	76(2)	111-112,117(10) 34(4)/DT10(4)	125,133,146, 155(10) 34,44(10)/DT13 (2)
Multiplication					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
B. Mathematical Concepts					
1. Solve problems involving					
Money	(See VII - 1)				
Time	(See VII - 1)				
Rates	(See III-B - 1)				
V. Number Sentences					
1. Write number sentence to describe word and picture problems	(See IV-A - 1)				
2. Complete sentences using symbols					
<,> (with numbers)	27(6)	52(6)	75(3)		
	2(10)/DT1(3)	DT6(3)			
--With sets & number rods	7-10(10)				
--With number line	12,27-28(10)				
=	27(3)	52(3)	75(3)		
+		52(4) 16(3)/DT5(3)	75(4)		
-		52(7) 16(3)/DT5(3)	75(4)		
3. Decode sentences with symbols					
<,>	7-8(2)				
=	16,20(10)(See also II-B,C,D,E)				
+,-	15,16,19,20(10)(See also II-B,D)				
x	(See also II-C,E				
( )		32(0)			127-128(0)
4. Use ( ) to show associativity	(See II-B,C,D,E)				
5. Solve open sentence by identifying					
Missing addend or sum	17-20(See also II-B,D)				
Missing factor	(See II-C,E)				
6. Recall families of facts					
Addition-subtraction	(See II-B - 2)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
7. Read-write sentences related to Capacity (liquid) Money	(See VII - 1)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER	1	2	3	4	5
PAGES	1 - 28	29 - 60	61 - 92	93 - 124	125 - 156
VI. Applications of Mathematics					
1. Apply mathematical concepts and skills to	(See VII)				
Capacity (liquid)					
Time					
Money					
Weight					
Length					
VII. Measurement					
1. Recognize and use systems of measurement					
Capacity					
--Cup			86-8(10) 26(2)/DT8(2)		
--Pint			86-8(10) 26(3)/DT8(2)		
--Quart			87-8(10) 26(4)/DT8(2)		
--Half-gallon					
--Gallon					
Time					
--Quarter-hour					
--Half-hour			84(10) 25(5)/DT8(2)		DT14(1)
--Hour			83(10) 25(4)/DT8(1)		DT14(2)
Money					
--Coin recognition & values					
--To dimes		57-8(10) 18(10)/DT5(5)		98(3)	41(5)
--To quarters					
--To half dollars					
--Making change					
--Word & picture problems		58-9(10) 18(9)			139,142,146(10)
--cent(c) designation (introduction)		57(10)			
Length					
--Unit segment			65-6(10) 21(10)/DT7(3)		
--Inch			67-8(10) 22(8)/DT7(4)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
--Half inch			82(5)		
--Centimeter			89-90(10) 27(4)		
--Foot			73-4(10) 23(4)		
--Using ruler			65-8,70-2,82, 89-90(10) 22(8)		
--Estimating length			69-72(10)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
Weight					
--Pound					
VIII. Geometry					
A. Nonmetric					
1. Identify basic concepts					
Points					
--Naming			62(8) 19(10)/DT7(1)		
Lines					
--Properties			61-2(2) DT7(1)		
--Naming			62(0)		
--Points on a line			62-3(8)		
--Intersecting lines			62(4)		
Line segments			63-8,70,79,82, 90(10) 20(10)		
--Properties			63(0) DT7(1)		
--End points			63-4(10) 20(10)		
--Naming			63(4) 20(10)		
--Congruent segments			65(10)		
2. Recognize geometric shapes					
Triangle					
Square					
Rectangle					
Circle					
3. Construct geometric figures					
Line segment			64(10) 20(10)		
4. Recognize regions					
Triangular					
Square					
Rectangular					
Circular					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
5. Identify topological concepts Open curve Closed curve --Points inside --Points outside					
6. Recognize relations and properties Symmetry					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER	1	2	3	4	5
PAGES	1 - 28	29 - 60	61 - 92	93 - 124	125 - 156
Congruence			65(10)		
Betweenness			69(6)		
B. Metric					
1. Describe fractional parts of regions and segments					
One-half					
--Region					
--Line segment			79(6)		
One fourth					
One third					
Three fourths					
Two thirds					
2. Measure length					
Perimeter (general)			74(2) 22(1)		
Unit of length (general)	(See VIII - 1)		21(10)		
Standard units of length	(See VIII - 1)				
--Inch	(" " ")				
--Foot	(" " ")				
--Centimeter	(" " ")				
Use of ruler	(" " ")				
Estimating length	(" " ")				
IX. Logical Thinking					
1. Recognize quantified statements: "all"				119-120(7) 37(1)	
2. Interpret if-then statements: Follow conditional directions				121-122(10) 37(7)/DT11(2)	
3. Arrange events chronologically	1,13(7)				
4. Recognize number patterns	(See II-D - 4 & II-E - 4)				
5. Complete set of number pairs (function)	(See X - 1)				
6. Interpret secret codes (numbers)	(See II-F)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156
X. Functions and Graphs					
1. Complete a set of number pairs (functions) by identifying function rule					
Addition-subtraction		51(4)		110(2)	145(3)
Multiplication					
2. Interpret bar graphs					
3. Represent data by simple bar graph					
4. Identify points and moves on number plane					
XI. Probability and Statistics	(See X - 2,3)				
1. Interpret bar graphs					
2. Represent data by simple bar graphs					
XII. Number Theory					
1. Recognize odd and even numbers	(See I-A - 2)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
I. Numbers and Numerals					
A. Numbers					
1. Recognize whole (cardinal) numbers					
To 9					
To 99					
To 999				269-272(10)	
2. Identify special concepts related to whole numbers					
Ordinal number					
Even and odd numbers					311-312(10) DT27(10)
Number pair					
Identity element					
--Zero (addition)					
--One (multiplication)					
Number patterns					
--Addition					
--Multiplication					
3. Recognize fractional numbers					
One-fourth (sets)			233-234(10) 71(4)/DT21(2)		
One-fourth (regions)			231-232(10) 71-72(8)/DT21(2)		
One-fourth (measurement)			238-240(10)		
One-half (sets)			227-228(10) DT20(3)		
One-half (regions)			223-224(10) 70(9)		
One-half (measurement)			237-238(10)		
One-third (sets)			243-244(10) 74(6)/DT21(2)		
One-third (regions)			241-242(10) 74(3)/DT21(2)		
Three-fourths (sets)			236(6) 72(4)/DT21(2)		
Three-fourths (regions)			235(4) 72(6)/DT21(1)		
Two-thirds (sets)			243-244(10) 74(6)		
Two-thirds (regions)			241-242(10) 74(3)		
Numbers greater than 1					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
B. Numerals					
1. Read numerals for whole numbers to 999 Compact form Expanded form				269-272(10) 271-272(10) 82(10)	
2. Write numerals for whole numbers (practice in writing digits)					
3. Recognize numerals for fractional numbers Words ("half", etc.)			223-224,231, 235-236,238-241,243(10) 70(9)/DT20(3)		
a/b form			223-224,227-228, 231-244(10) 71-4, 77(10)		
Mixed numeral form			DT21(10)		
4. State the place value of a digit To tens To hundreds				271-272(9) 82(6)	
C. Number-Numeral Distinction 1. Identify more than one name for same number : Equations					
2. Rename addends and sums					
3. Rename factors and products					289(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
D. Ordering					
1. Order 3 or more whole numbers in a counting sequence					
By ones to 9					
99					
999		60(3)			
By tens to 99					
999				269(9)	
By hundreds to 999				269(1)	
By twos, threes and fives					291,298,304(10) 92(2)/DT26-7(2)
2. Order whole numbers using relational terms and symbols					
Greater than(>), less than(<), equal(=)		198(10)			
Before					312(6)
After					312(6)
Between					
3. Order fractional numbers			73(1)		
E. The Number Line					
1. Represent order of whole numbers		60(3)		269(10)	311(0)
Even and odd numbers					
2. Represent order of fractional numbers			73(1)		
3. Represent relations Before, after, between					
4. Identify directions Left-right					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
5. Represent operations					
Addition	183-184(10)	195(10)			289-290(8)
Subtraction				253(10)	
Multiplication				DT23(4)	289-291,298, 304(10)
Inverse operations --Addition-subtraction					
6. Use vertical number line			245(6)		
7. Represent properties - associativity of addition					
8. Represent measurement					
F. Concrete Models for Numbers and Numerals					
1. Represent whole numbers					
Abacus	157-185(10)			271-272(4) 82(6)	
Structured sets and bundles	157-164,173-176(10)	203			
Number rods					
Place-value chart				271(7)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
2. Represent fractional numbers					
Sets-subsets					
Regions-subregions					
3. Represent relations on numbers					
Equality-inequality (number rods)					
II. Mathematical Operations					
A. Properties					
1. Recognize properties of mathematical operations					
Associativity					
--Addition	161,183-186(10)	203(0)			
Commutativity					
--Addition					90(1)
--Multiplication					292,300,306(9)
Identity elements					90(9)
--Zero (addition)					310(9)
--One (multiplication)					310(4) 93(7)
Zero as a factor					
Inverse operations					
--Addition-subtraction				267(6) 81(0)	
B. Development of Addition and Subtraction					
1. Identify terms and related components					
"Addend"					
"Sum"					
2. Recall basic facts					
Sums through 6					
7					
8					
9					
10					
11					
12					
13					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
14					
15				86(10)	
16					
17					
18		68(6)			
One as an addend					310(10)
Families of facts		68(1)			
3. Recognize models for addition					
Union (joining two sets)	161-164,185(10)				287-288(10)
Number rods					
Abacus	157-159,162,164,166, 169,185(10) 53,57(4)	193,199(6)		275(2)	
4. Add whole numbers to three places					
One addend greater than ten					
--No renaming		195(1)			
--Renaming	184-186(10) 58(10)	195(10)			
Tens	157-158,160(10) 49(10)/DT15(4)				
Tens and ones					
--No renaming	163-171(10) 50-53,57-58(10) DT15-16(10)	193-194(10) 60(10)	DT22(2)		DT28(1)
--Renaming ones as tens		199-202,204-206(10) 62-65(10)/DT18,19(10)	DT22(2)	267,282-283(10)	DT28(2)
Hundreds, tens, and ones					
--No renaming				273-276,282(10) 82-3(10)/DT25(10)	DT28(2)
Three or more addends	58(3)	207(10)		286(10)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
5. Recognize models for subtraction					
Separation of subset from set	173-176(9)			79(1)	
Number rods					
Abacus	174,176,178, 180(9) 55,57(5)	193(3)		257,263,279(10)	
Missing addend(introduction)					
6. Subtract with whole numbers to three places					
One place number from two place number					
--No renaming	54(2)				
--Renaming				253-256(10) 78(10)/DT23(6)	
Tens	159-160(10)				
Tens and ones					
--No renaming	175-182(10) 54-57(10)/DT16. 17(10)	193-194(10) 60(6)	DT22(2)		DT28(1)
--Renaming tens as ones				257-260,263-266(10) 79-80(10)/DT24(10)	DT28(2)
Hundreds				277(4)	
Hundreds, tens, and ones					
--No renaming				277-280,282,285(10) 84(10)/DT25(4)	DT28(2)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
C. Development of Multiplication					
1. Recall basic facts					
0 as a factor					310(10) 93(7)
1 as a factor					310(4)
2 as a factor					288-294(10) 87,90,92(10) DT26-28(10)
3 as a factor					303-306(10) 90,91,92(10) DT26-28(10)
5 as a factor					297-300(10) 89,90,92(10) DT26-28(10)
2. Recognize model for multiplication					
Addition-equal addends					287-290(10)
Set of equivalent sets					287,288,297, 303(10) 87(3)
D. Addition and Subtraction Algorisms					
1. Use counting algorism	161-164,173-176 185(10)				287-288(10)
2. Use horizontal-form algorism					
Equations	161,173,183-186 (10) 58(10)			82(6)	
3. Use vertical-form algorism					
Expanded numerals	163-166,175-178 (10) 50-51,54(10)	193,199-200(10) 62(8)/DT18(2)		257-258,263-264, 275,279(10) DT23(6)	
Column diagrams	168-169,171,179-181(10) 51,55(10)/DT15, 17(4)	204(6) 63(6)		275,279(6)	
Three-step method	169-170,180(10) 52,56(10)/DT16, 17(10)	201-202(10) 63(10)/DT18(5)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
Four-step method				274,278(10) 83-84(9)	
Working (short) form	171,181,(10) 53,57(10) DT16,17(10)	204-206(10) 60,64(10)/DT19(5)	DT22(6)	259,265,275,279 (10) 78-80,83-84(10) T24-25(10)	DT28(10)
4. Use algorisms with Sets of ordered pairs (functions)					
--Addition		207-208(10)	229-230(10)	286(4)	
--Subtraction					
Number patterns					
--Addition		207-208(10) 65(10)	229-230(10)	286(3)	
--Subtraction					
Number wheels					
--Addition			229(1)		
--Subtraction			229(1)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
E. Multiplication Algorism 1. Use skip counting algorism (counting by twos, threes, etc.)					289-293,297, 304(10) 87(10)/DT26-27 (2)
2. Use horizontal-form algorism Equations					288-293,297-300,303-305(10) 89(4)/DT28(6)
3. Use vertical-working-form algorism					294(10) 92(10)/DT26-28 (10)
4. Use algorism with Ordered pairs (functions) Number patterns					293,299,305 307,313-314(10)
F. Extensions 1. Translate a secret code Addition-subtraction				282(7) 80(10)	
Multiplication					316(6)
III. Sets A. Recognition 1. Recognize set from description or roster Member of a set (inclusion) Brace notation					314(0)
2. Recognize relations between sets Subset Equivalence Nonequivalence Equality			227-228,233-234,243-244(10)		287-288,297-303(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
3. Recognize special sets					
Empty set					
Sets of ordered pairs (functions)					(See X - 1)
Set of equivalent subsets			227-228,233-234 236,243-244(10)		287-288,297, 303(10) 87(3)
4. Identify cardinal number property of sets to 18					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
B. Operations					
1. Perform operations with sets					
Matching members					
--One to one					
--One to many (rates)		191-192,209(10)	237-238(10)		301-302,309(10) 94(10)
Joining sets (union)					
Separating subsets from set					
Comparing sets					
2. Recognize properties of set operations					
Associativity of union		203(0)			
Commutativity of union					
3. Relate set operations to operations on numbers					
Joining sets					
--Addition					
--Multiplication					
Separating sets					
--Subtraction					
IV. Problem Solving					
A. Mathematical Operations					
1. Complete number sentence associated with word-picture problems	172,182,187(10)	215(5) 67(3)/DT19(3)		261-262(10) 83-85(9)/DT24,25 (4)	302,309(10) 88(4)
2. Perform operations related to sets					
Joining					
Separating					
Comparing					
3. Solve verbal problems involving					
Addition-subtraction	172,187(10) 53,55(4)	194,197,215(10) 67(6)/DT19(3)		261,262,268,281, 284(10) 83,85(7)/DT24-25(4)	296(5)
Multiplication					295,301,307, 309(10) 88(5)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER	6	7	8	9	10
PAGES	157 - 188	189 - 216	217 - 252	253 - 286	287 - 316
B. Mathematical Concepts					
1. Solve verbal problems involving					
Money					
Time					
Rates					
V. Number Sentences					
1. Write number sentence to describe word and picture problems					
2. Complete sentences using symbols					
<,>(with numbers)		198(9)			
--With sets & number rods					
--With number line					
=		198(3)			
+		198(4) 68(4)			
-		198(7) 68(2)			
3. Decode sentences with symbols					
<,>					
=					
+,-					
x					288(8)
( )					
4. Use ( ) to show associativity					
5. Solve open sentence by identifving					
Missing addend or sum					
Missing factor					
6. Recall families of facts					
Addition-subtraction					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
7. Read-write sentences related to Capacity (liquid) Money					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
VI. Applications of Mathematics					
1. Apply mathematical concepts and skills to					
Capacity (liquid)					
Time					
Money					
Weight					
Length					
VII. Measurement					
1. Recognize and use systems of measurement					
Capacity					
--Cup			237-238(3)		
--Pint			237-238(5)		
--Quart			237-238(5)		
--Half-gallon			238(2)		
--Gallon			238(2)		
Time					
--Quarter-hour			239-240,251(9) 73,77(4)		
--Half-hour		68(3)	73,77(2)		
--Hour					
Money					
--Coin recognition & values					
--To dimes	160,162,164, 174,176,182(9) 49(5)	189-190,196(10) 59(5)			89(8)
--To quarters		191-192(10) 64(6)/DT18(4)	DT22(1)		
--To half-dollar		209-214,216(10) DT19(3)	237(1) DT22(1)	283(4)	302(2)
--Making change		214(5)	DT22(6)		
--Word & picture problems	160,182,188(7) 55(2)	194,197,214(10) 61,66(10)/DT18(4)		268(4) DT24(2)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
--cent (c) designation (introduction)					
Length					
--Unit segment					
--Inch					
--Half inch					
--Centimeter					
--Foot					
--Using ruler			252(6)		
--Estimating length					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER	6	7	8	9	10
PAGE	157 - 188	189 - 216	217 - 252	253 - 286	287 - 316
Weight					
--Pound				281(0)	
VIII. Geometry					
A. Nonmetric					
1. Identify basic concepts					
Points					
--Naming					
Lines					
--Properties					
--Naming					
--Points on a line					
--Intersecting lines					
Line segments					
--Properties					
--End points					
--Naming					
--Congruent segments					
2. Recognize geometric shapes					
Triangle			219-220(3) 69,77(10)/DT20 (1)		
Square			219-220(3) 69,77(5)/DT20 (1)		
Rectangle			219-220(2) 69,77(10)/DT20 (1)		
Circle			219-220(2) 69,77,(10)/DT20 (1)		
3. Construct geometric figures					
Lines segment					
4. Recognize regions					
Triangular			222(3)		
Square			222(2)		
Rectangular			222(2)		
Circular			222(3)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
5. Identify topological concepts					
Open curve			217(3)		
Closed curve			217(3)		
--Points inside			221(5) 69(5)/DT20(4)		
--Points outside			222(3) 69(3)		
6. Recognize relations and properties					
Symmetry			225-226(4) 70(9)/DT20(4)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
Congruence			218(7)		
Betweenness					
B. Metric					
1. Describe fractional parts of regions and segments					
One-half					
--Region			223-224(10)		
--Line segment					
--Number line					
One fourth			231-232(10) 71(4)		
One third			241-242(10)		
Three fourths			235(4) 72(2)		
Two thirds			241-242(10)		
2. Measure length					
Perimeter (general)					
Unit of length (general)					
Standard units of length					
--Inch					
--Foot					
--Centimeter					
Use of ruler					
Estimating length			252(6)		
IX. Logical Thinking					
1. Recognize quantified statements: "all"					
2. Interpret if-then statements: Follow conditional directions					
3. Arrange events chronologically					
4. Recognize number patterns					
5. Complete set of number pairs (function)					
6. Interpret secret codes (numbers)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 2 (continued)

CHAPTER PAGES	6 157 - 188	7 189 - 216	8 217 - 252	9 253 - 286	10 287 - 316
X. Functions and Graphs					
1. Complete a set of number pairs (functions) by identifying function rule Addition-subtraction Multiplication					307,314(5)
2. Interpret bar graphs			75(2)/DT22(4)		
3. Represent data by simple bar graph			245-250(10) 75(5)		
4. Identify points and moves on number plane			249-250(10) 76(5)		
XI. Probability and Statistics					
1. Interpret bar graphs					
2. Represent data by simple bar graphs					
XII. Number Theory					
1. Recognize odd and even numbers					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
I. Numbers and Numerals						
A. Numbers						
1. Recognize whole (cardinal) numbers						
To 9	4-5(10) 2-3(10)/DT1(3)					
99	6-9(10) 4(10)/DT1(6)					
999	14-16(10) 6(9)/DT2(9)					
9,999	20-1(10) 8(10)/DT2(6)					
99,999						
999,999						
9,999,999						
2. Identify special concepts related to Whole numbers	3-9,12-6,18, 20(10) 2-3(10)/DT1-2 (10)					
Ordinal number	12,23(10)					
Even and odd numbers						
Prime numbers						
Number pair		37,45,51,53(10) 16(21)/DT3(2)	63,65,79(10) 19,24(10)/DT6 (10)		140(10)	
Identity element						
--Zero (addition)		29,32-3,36(9)			125(3)	
--One (multiplication)					129,132,147(10) 40(10)/DT12(3)	
Fractional numbers						158-171(10) 44-8(10)/DT15-16(10)
3. Recognize fractional numbers						
Half						158,160-169(10) 45-6(6)/DT15(2)
Thirds						158-169(10) 44-6(10)/DT15(4)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Fourths						158-169(10) 44-6(10)/DT15(5)
Fifths						158-169(10) 44-6(4)/DT15(3)
Sixths						158-159,161-163, 166-169(10) 44-5(7)/DT15(1)
Sevenths						182(1) 44-5(4)
Eighths						159,161-162, 166-169(10) 44(1)/DT15(1)
Ninths						166,168(1) 44(1)
Tenths						167(1) 44(1)
Twelfths						166,169(2) 44-5(3)
Numbers greater than 1						178-179(2) 50(10)
B. Numerals						
1. Recognize numerals for whole numbers						
Expanded numeral form	7-8,14,16,21 (10) 4,6,8(10)/DT 1-2 (9)					
Compact numeral form	7-8,14,16,21 (10) 4,6,8(10)/DT 1-2 (9)					
--Periods						
Roman numerals						
2. State the place value of a digit	6-8,14-16,20-21(10) 4,6,8(10)/DT 1-2 (9)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
3. Recognize numerals for fractional numbers a/b form						156-163(10) 44-5(10)/DT15,16 (10)
Mixed numeral form						178-179(10) 50(10)/DT16(4)
Decimal (decimal point) --Money						
Equivalent fractions --Numbers less than one						166-169(10) 47(10)/DT15(3)
--Numbers more than one						179(8) 50(10)/DT15(3)
4. Regroup numerals through hundreds			72-5,83,87 (10) 25-6(10)/DT6 (10)			
C. The Number-Numeral Distinction 1. Identify more than one name for same number	4(10) 2(10)					
Equation	(See II: All outcomes)					
Algorism	(See II-D, E)					
2. Rename addends and sums	(See II-B - 1,2,4,6; II-D - 2,3,4,5)					
3. Rename factors and products	(See II-C - 1,2,4,5,7,8; II-E: All outcomes)					
D. Ordering 1. Order 3 or more whole numbers in a counting sequence By ones to 9	10(8) 5(3)					
99	11(10) 5(1)/DT1(1)					
999	18(10)					
9,999						

LMS MATH

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
By twos	11(10) 5(10)					
By threes	5(1)					
By fours						
By fives	11(4) 5(1)/DT1(1)					
By tens to 99	11,15(5) 5(2)/DT1(1)					
999	15,18(10) 6(8)/DT2(3)					
9,999						
By hundreds to 999	15,20(10) 6(8)					
9,999	20(9) DT2(3)					
By thousands	20(10) 8(10)					
By millions						
2. Order whole numbers using relational symbols <, > and =	5,15,18(10) 3(10)/DT1,2(6)					
3. Order fractional numbers						170-171(10) 48(10)/DT15(3)
E. The Number Line 1. Represent order of whole numbers	10-11,15,18, 20(10)				DT11,12(10)	
2. Represent multiples of whole numbers (skip counting)						
3. Represent order of fractional numbers		35(10)				163,165,169,171 178-179(10) 45,50(10)/DT15(4)
4. Identify directions Left-right	10,15,18,20(10)	35(10) 12(6)				
Up-down		35(10)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
5. Represent operations						
Addition		34-5,39-40,51 (10) 12,17(6)/DT3(1)	63(10)			
Subtraction		34-5,53,55(10) 12,17(5)/DT3(1)	65(10)			
Multiplication					126-127,133, 137,143(10) DT11,12(3)	
Division						
Inverse operations						
--Addition-subtraction		34-5(10) 11(10)/DT3(6)				
--Multiplication-division						
Rounding				106-107(10) 8(4)		
6. Use vertical number line		35(10)				
7. Recognize number plane						
8. Represent properties						
Associativity		51,53(10)				
Commutativity					126-127,137(11)	
F. Concrete Models for Numbers and Numerals				(See also II-B - 3,5; II-C - 3,6)		
1. Represent whole numbers						
Abacus	8,16,21(10) 8(4)/DT1,2(9)					
Sets & structured bundles	3-5,7(10) 2-3(10)					
Number rods		32-3(10)				177(10)
2. Represent fractional numbers						
Set-subset						158-159,166(10) 44(10)/DT15(3)
Region-subregion						160-161,167-168 (10) 45(8)/DT15(3)
Number bars						162,168,170,178 (10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
II. Mathematical Operations						
A. Properties						
1. Recognize properties of mathematical operations						
Associativity						
--Addition		49(10) DT4(3)				
Multiplication						
Commutativity						
--Addition		30-1(10) 11(6)/DT3(6)				
--Multiplication					126,134(10) 37(8)	
Noncommutative operation						
--Subtraction						
Common factor (distributive) property						
--Multiplication						
--Division						
Identity elements						
--Zero (addition)		29,32-3,36(9)			125(3)	
--One (multiplication)					128-129,132-133, 147(10) 40(10)/DT12(3)	
Closure						
--Addition						
--Multiplication						
Inverse operations						
--Addition-subtraction		27,30-1,44(10) 11(6)				
--Multiplication-division					130-131(10) 37(8)	
B. Development of Addition-Subtraction with Whole Numbers						
1. Recognize related terms						
Addend		29(10) 10,11(10)/DT3, 4(10)				
Sum		29(10) 10,11(10)/DT3, 4(10)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 26	27 - 60	61 - 92	93 - 124	125 - 156	157 - 188
Difference		30-33(10) 10,11(10)/DT3, 4(2)				
Missing addend		10,11(2)/DT3, 4(2)				
2. Recall basic facts						
Addition		30-3,39-45(10) 10-11,14-5(10) DT3(10)				
Subtraction		32-3,39-45(10) 10-11,14-5(10) DT3(10)				
Families of facts		30-1(10) 11(6)/DT3(4)				
3. Recognize models for addition						
Union (joining) of sets		27,29-30,46-8, 54,64(4) 10(2)				
Number rods		32-3(10)				
Abacus		50,52,54,55,62 (9) 16(6)	67,72-3,82(10)			
4. Add whole numbers to millions						
One addend greater than ten		50-1(10) 16(10)/DT4(3)	62-3(10) 19(4)/DT5(5)			
Tens		54,56(10) 17(4)/DT4(3)				
Tens and ones						
--No renaming			67-9(10) 20,24(10)			
--Renaming ones as tens			80-3(10) 25(10)/DT6(5)			
Hundreds						
Hundreds and tens						
--No renaming						
--Renaming tens as hundreds						
Hundreds, tens, and ones						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
--No renaming			72-5(10) 21(8)/DT5(3)			
--Renaming ones as tens						
--Renaming tens as hundreds						
--Renaming both tens as hundreds and ones as tens						
Thousands, hundreds, tens, and ones						
--Renaming hundreds as thousands						
--Renaming ones as tens						
--Renaming tens as hundreds						
Millions						
--Renaming ones as tens						
Three or more addends		38-40,49(10) 13,15(10)/DT4 (3)			125(10) 36(10)	
Mental computation						
5. Recognize models for subtraction						
Separation of subset from set		27,30,46,55(6) 10(4)	61(2)			
Number rods		28,32-3(1)				
Abacus		52,55(5)	64,67,72(7)			
Missing addend		32-3,41-3(10) 11,14(10)/DT3 (10)				
6. Subtract with whole numbers to millions						
Number less than ten from a number greater than 18		52-3(10) 16(10)/DT4(3)	61,64-5(10) DT5(5)			
Tens		55-6(10) 17(7)/DT4(3)				
Tens and ones						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
2. Recall basic facts						
Multiplication					126-129,132-134, 136-138,142-144 (10) 36-9(10)/DT11, 12(10)	
Division					130-131,134,138, 144(10) 37-9(10)/DT11,12 (10)	
Families of facts						
3. Recognize models for multiplication						
Addition-equal addends					125-126,132,136, 142(10) 36(7)	
Set of equivalent sets					144(10)	
Pairing elements of two sets (cross product)					132,134,136,142 (10)	
4. Multiply whole numbers						
Zero as a factor					147(10) 40(10)/DT12(3)	
One as a factor					147(10) 40(10)/DT12(3)	
Two as a factor					126-129(10) 36(10)/DT11(5)	
Three as a factor					132-134(10) 37-8(9)/DT12(3)	
Four as a factor					136-138(10) 37-8(3)/DT12(3)	
Five as a factor					142-144(10) 39(9)/DT12(3)	
Six as a factor						
Seven as a factor						
Eight as a factor						
Nine as a factor						
5. Multiply numbers to three places (one factor less than ten)						
Tens						
Tens and ones						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
--No renaming			67-9,24(10) 20(10)/DT5(5)			
--Renaming tens as ones			34-7(10) 26(10)/DT6(5)			
Hundreds						
Hundreds and tens						
--No renaming						
--Renaming hundreds as tens						
Hundreds, tens, and ones						
--No renaming			72-5(10) 21(8)/DT5(2)			
--Renaming tens as ones			87(5) 26(10)			
--Renaming hundreds as tens						
Thousands, hundreds, tens, and ones						
--No renaming						
--Renaming thousands as hundreds						
Millions						
--Renaming thousands to hundreds						
Mental computation						
C. Development of Multiplication-Division with Whole Numbers						
1. Recognize related terms						
Factor					127-129,131(10) 37(10)/DT11(3)	
Product					126-127,129,131 (10) 37(10)/DT11,12 (10)	
Quotient						
Missing factor						
Remainder						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
--No renaming						
--Renaming ones as tens						
Hundreds						
Hundreds and tens						
--No renaming						
--Renaming tens as hundreds						
Hundreds, tens, and ones						
--No renaming						
--Renaming ones as tens						
--Renaming tens as hundreds						
--Renaming both tens as hundreds and ones as tens						
6. Recognize models for division						
Repeated subtraction						
Separation of equivalent subsets from a set					130(4)	164(6) 46(3)/DT15(3)
Missing factor						
7. Divide with whole numbers						
Two as a factor					130-131(10) 37(7)/DT11(5)	
Three as a factor					134-135(10) 37,38(10)/DT12 (3)	
Four as a factor					138(10) 38(6)/DT12(3)	
Five as a factor					144-145(10) 39(10)/DT12(3)	
Six as a factor						
Seven as a factor						
Eight as a factor						
Nine as a factor						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 26	27 - 60	61 - 92	93 - 124	125 - 156	157 - 188
8. Divide numbers to three places with single digit divisor						
1-digit quotient						
--No remainder						
--Remainder						
2-digit quotient						
--No remainder						
--Remainder						
D. Addition and Subtraction Algorisms						
1. Use counting algorism		34-5(10)			127,133,137, 143(10) 36(7)/DT11(8)	
2. Use horizontal-form algorism						
Equations		28-33(10) 10-12(10)/DT3 (10)	24(10)			
3. Use vertical-form algorism						
Expanded numerals			67(10) 21,25,26(7)			173(10) DT16(4)
Column diagrams		50,52(6)	73-5,82,85-6 (10) 20,25(10)			
Three-step form		68(10)	68,86(2) 20,25(10)			
Four-step form			74,85(10) 21(6)			
Working (short) form		29,31,35,38, 41-4(10) 11,14(10)/DT3, 4(10)	69,75,80-3(10) 20,26(10)			
4. Estimate sums and differences						
5. Check addition and subtraction						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
E. Multiplication and Division Algorisms						
1. Use horizontal-form algorism for multiplication						
Equation					128,132,138 (10) 37-9(10)	
2. Use vertical-form algorism for multiplication						
Expanded numerals						
Three-step method						
Four-step method						
Working (short) form					129,132,136- 138(10) 38(6)/DT11,12(10)	
Common factor rule						
3. Use horizontal-form algorism for division						
Equation					130-131(10) 37-9(10)/DT11, 12(10)	
4. Use vertical-form algorism for division						
Working form-single digit quotients						
--No remainder						
--Remainder						
Working-form-2-digit quotients						
--Scaffold method						
---No remainder						
---Remainder						
--Pyramid method						
---No remainder						
---Remainder						
--Regular (compact) method						
---No remainder						
---Remainder						
--Common factor rule						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 26	27 - 60	61 - 92	93 - 124	125 - 156	157 - 188
5. Check division by multiplying						
F. Operations with Fractional Numbers 1. Rename fractions (equivalent fractions)						166-169(10) 47(10)/DT15(6)
2. Add fractional numbers with common denominators (sums less than one)						176-177(10) 48(10)/DT16(3)
3. Represent order of fractional numbers on number line						163,169,171, 178-179(10) 45,50(2)/DT5(4)
4. Relate fractional numbers to division						164(10) 45(10)
G. Extensions 1. Recognize alternative algorisms Addition Subtraction Multiplication-Division						
2. Translate secret codes Addition & Subtraction Multiplication & Division Number plane			78(10)			
III. Sets A. Recognition 1. Recognize set from description or roster Member of a set	1-2(10) 1(9)/DT1(4)					
Brace or ring notation	1-2(10) 1(6)/DT1(4)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
2. Recognize relations between sets						
Subset	2(10) 1(6)/DT1(2)					157(6) 44(10)/DT15(3)
Equivalence	3(6) 2(6)					
Nonequivalence	5(4) 3(8)	28(2)				
3. Identify special sets						
Empty set	1-2,4(5)					
Finite set	1-2(10) 1(8)/DT1(4)					
Infinite set	1-2(3) 1(1)					
Set of equivalent subsets						
Set of ordered pairs (functions)		37,45,51(10) 16(3)/DT3(2)	16(2)/DT6(3)		137,140(10) 41(10)	
Sets of points (geometric figures)				99,115(8) 33(3)		
4. Identify cardinal number property of sets	3-5(10) 2(6)/DT1(4)	27-8(8) 10(6)				157(8) 44(10)/DT15(3)
B. Operations						
1. Perform operations with sets						
Matching members						
--One to one	3(8) 2(6)					
--One to many						
Joining two sets (union)	(See II-B - 3 and II-C - 3)					
Separating subset from set	(See II-B - 5 and II-C - 6)					
Identifying cross product of two sets						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Comparing sets	3,5(10) 3(8)	28(2)		109(8)		158-159,164, 166(10)
2. Recognize properties of set operations						
Associativity of union						
Commutativity of union						
3. Relate set operations to operations on numbers						
Joining sets						
--Addition	(See II-B - 3)					
--Multiplication	(See II-C - 3)					
Separating sets						
--Subtraction	(See II-B - 5)					
--Division	(See II-C - 6)					
IV. Problem Solving						
A. Mathematical Operations						
1. Write number sentence describing verbal problem		47(4)	76(7) 22(6)			
2. Perform operations related to sets	(See III-B - 1)					
Joining						
Separating						
Comparing						
3. Solve verbal problems involving						
Five-step method		47(4)	76(7) 22(6)			
Addition & Subtraction	13,19(10)	46-8,56-7(10) 15(10)	66,68-9,71, 73-6,81-2, 87-8(10) 76,89(10)/DT5 (3)			
Multiplication-Division					131,135,139, 141,145-146, 149,153(10) DT13(7)	181,185(10)
Two-stage problems						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
B. Mathematical Concepts						
1. Solve verbal problems involving						
Money	(See also VII)				148-149(10) 41(10)/DT13(4)	184-185(10)
Time	(See also VII)				153(8) 42-3(10)/DT13 (6)	
Rates					135,139,145, 149,150-153 (10)	
Weight						
Distance					146,149(10)	
Social activity		48,56(10) DT4(1)	66,68-9,76 (10)		146(6)	181(6)
Science		57(7)				
Miscellaneous	13(7)	47(4) 17(7)	73-6,81-2,88 (10) 22,27(10)			
V. Number Sentences						
1. Write number sentence to describe word problem	(See IV-A - 1)					
2. Complete sentences using symbols						
<,>,=	5,15,18(10) 3(10)/DT1,2(6)		89(10)		141(10)	170-171(10) 48(6)/DT15(3)
=						
+,-						
x						
÷						
3. Decode sentences with symbols						
+,-	(See II)					
x,÷	(See II)					
÷	(See II)					
<,>						
=	(See II)					
□, ○	(See II-A,B,C)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
4. Use parentheses( )						
To group addends		38,49(10) 13(10)/DT4(3)				
To group factors						
5. Solve open sentence by identifying						
Missing addend or sum		29-30,32-4,38, 49,50-1(10) 10-11,14(10)/ DT3,4(10)	72-3(10) 21(8)			
Missing factor or product						
--Multiplication sentence					125,128,132, 138(10) 36-9(10)/DT11, 12(10)	
--Division sentence					130-131(10) 37-9(10)/DT11, 12(10)	
6. Recall families of facts						
Addition-subtraction		30-1,42(10) 11(4)/DT3(10)				
Multiplication-division						
7. Read-write sentences related to						
Money	(See also IV-A - 1; VII - 1)			(See also IV-A - 1; VII - 1)		
Capacity (liquid)	(See also IV-A - 1; VII - 1)			(See also IV-A - 1; VII - 1)		
VI. Applications of Mathematics						
1. Apply mathematical concepts and skills to						
Science						
--Animals		57(7)				
--Human body	22(8)					
--Space						
--Distance						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
---Minute						
---"Past"					150-153(5) 42(2)/DT13(1)	
---"To"					150-153(4) 42(2)/DT13(2)	
Money						
--Cent-penny, nickle, dime	9,17,19(10) 6(5)	17(2)	70-1,77(10) 23(10)/DT6(3)		39(10)/DT13(4)	
--Coins to quarters			77(9) 23(10)/DT6(2)		39(3)	
--Coins to half-dollars			77(5) DT6(1)			
--Coins to dollar (bill)	17,19(10) 6(5)		77(7)			
--Coin values, making change			71(10)			
--Symbols						
---¢	9,17,19(10) 46(10)		70-1,77(10) 23(10)/DT6(3)			
---$	17,19(6)					
Length						
--Unit						
--Yard				108(2) 31(6)/DT9(2)		
--Foot				108-109(9) 31(6)/DT9(3)		
--Inch				104,107,111(10) 31(10)/DT9(3)		
--Half inch						180-181(5) 50(1)/DT16(1)
--Quarter inch						180-181(3) 50(5)/DT16(4)
--Centimeter				105,107,110-111(10) 31(3)		
--Use of ruler						
Area						
--Square unit				116-117(10) 34(10)/DT10(2)		
---Square inch						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Social studies & Misc.			66,76,88(10) 22,27(10)/DT5 (3)		139,146(10)	
--History						
--Pollution					146(6)	
Sports		48,56(10)				
2. Apply mathematical concepts and skills to Capacity Time Money Linear Measurement	(See IV-B - 1; VII - 1)			(See IV-B - 1; VII - 1)		
VII. Measurement 1. Recognize and use systems of measurement Capacity						
--Cup						184-185(10) 52(7)/DT16(2)
--Pint						184-185(10) 52(5)/DT16(2)
--Quart						184-185(10) 52(9)/DT16(3)
--Gallon						184-185(4) 52(8)/DT16(1)
Time						
--Calendar	23					
---Day	23(10)					
---Week	23(10)					
---Month	23(10)					
--Clock-Tell time						
---Hour					150-153(4) 42-3(10)/DT13 (6)	
---Half hour					150-153(4) 42-3(0)	
---Quarter hour					150-153(3) 42-3(10)	
---Nearest 5 minutes					150-153(10) 42-3(10)/DT13 (3)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 26	27 - 60	61 - 92	93 - 124	125 - 156	157 - 188
Volume						
--Cubic unit						
---Cubic inch						
Weight						
--Pound						
--Ounce						
Quantity						
--Dozen						
III. Geometry						
A. Nonmetric						
1. Identify basic concepts						
Point				99,101(4)		
Curve				99(4)		
Line				99(8) 30(10)		
--Parallel lines						
Line segment				100(8) 30(10)		
--End points				100-101(9)		
--Parallel segments						
Ray				100-101(7) 30(10)/DT9(8)		
--End point				100-101(9)		
Angle						
--Union of two rays				101(4) 30(2)/DT9(1)		
--Congruent angles						
--Right angle				102(7) 30(7)/DT9(1)		
Plane				114(4) 33(6)		
--Curve in a plane				99(4)		
--Line in a plane						
--Line segment in a plane						
2. Recognize geometric figures						
Polygon (general definition)						
--Sides				100-101(10)		
--Corner points				100-101(9) 30(7)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Triangle				93,101(7) 28(10)/DT8(4)		
Square				93,102(6) 28(10)/DT8(4)		
--Diagonal						
Rectangle				93,102(7) 28(10)/DT8(4)		
Hexagon						
Circle				93(1) 28(10)/DT8(4)		
--Center				110-111(2) 32(7)		
--Radius				110-111(10) 32(7)/DT10(2)		
--Diameter				110-111(5) 32(7)/DT10(1)		
3. Construct geometric figures						
Circle				110-111(6) DT10(2)		
Angle						
--Right angle						
Line segment				104-105(10) 34(5)/DT8,10 (4)		
Triangle						
Patterns of figures						
4. Recognize regions						
Triangular				116-117(4) 34(4)		
Square				116-117(2) 34(1)		
Rectangular				116-117(8) 34(2)		
Circular				115(1)		
5. Identify topological concepts						
Open curve				114-115(6) 33(4)/DT10(4)		
Closed Curve				114-115(6) 33(4)/DT10(4)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
--Simple closed curve				114-115(0) 33(4)/DT10(4)		
--Points on closed curve				114-115(0) 33(4)		
--Points inside				114-115(4) 33(3)		
--Points outside				114-115(4) 33(2)		
--Regions inside				115(4) 33(3)/DT10(4)		
6. Identify simple closed surfaces						
Cylinder						
Sphere						
Cube						
--Edge						
--Face						
--Corner points						
7. Recognize operations, relations, and properties						
Comparison of regions (fractional numbers)						160-161,167(10) 45(8)/DT15(3)
Transformation of figures						
--Slides				95-7(10) 29(3)/DT8(1)		
--Flips				29(3)/DT8(1)		
--Turns				DT8(1)		
Symmetry						
Congruent figures				95-7(10) 29(6)/DT8(3)		
B. Metric						
1. Recognize area						
Fractional parts of subregions						160-162,167-168, 170(10) 45(8)/DT15(3)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Unit of area						
--Square unit				116-117(10) 34(10)/DT10(2)		
Area of regions						
--Triangular				116-117(3) 34(4)/DT10(1)		
--Square				116-117(1) 34(1)		
--Rectangular				116-117(8) 34(2)/DT10(1)		
--Circular				116-117(0)		
2. Identify coordinate system-number pairs						
Points in a number plane				118-121(10) 35(8)		
Lattice arithmetic						
3. Measure length	(See also VII - 1)					
Unit of length (general)				103(8)		
Estimate length						
--Nearest inch				31(9)/DT9(4)		
--Nearest half-inch				107(8)		180(5) 50(1)/DT16(1)
--Nearest quarter-inch						180(5) 50(5)/DT16(3)
--Nearest centimeter				107(8) (3)/DT9(4)		
--Nearest foot						
--Nearest yard				31(6)		
4. Measure volume	(See VII - 1)					
Unit of volume (general)						
--Cubic unit						
IX. Logical Thinking						
1. Recognize quantified statements: "all"-"some"-"none"						174-175(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
2. Represent if-then statements using set and subset						174-175(0)
3. Complete simple if-then statements (rates)					135,145(10) 37(4)/DT13(7)	
4. Recognize patterns					140(10)	173(10)
Number	11,14,20(10)	36-7,45,51, 53,60(10) 12,14(10)	79(10) 19,24(10)			
Geometric				94(4) 29(4)/DT8(1)		
X. Functions and Graphs						
1. Identify functions and rules						
Addition rules	11(9)	37,45,51(9) 14,16(3)	79(2) 24(2)			
Subtraction rules		37,45(5) 14,16(3)	79(3) 24(2)			
Multiplication rules					140(10)	
Division rules					140(1)	
Number pair TV					140(6)	
2. Interpret data						
Bar graph				118-121(10) 35(8)/DT10(4)		
Line graph (number plane)						
3. Represent data						
Bar graph						
Line graph (number plane)						
4. Recognize symbol for measurement function: m ( )						
XI. Probability and Statistics						
1. Identify statistical and probabilistic concepts						
Probability of simple events represented by fractional numbers						182-183(10) 51(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Combinations determined by means of cross-product						
2. Interpret bar graphs	(See X - 2)					
XII. Number Theory						
1. Recognize special sets of numbers						
Prime numbers	(See I-A - 1)					
--Prime number patterns	(See I-A - 1)					
Even and odd numbers	(See I-A - 1)					
2. Identify factors Common factor						
3. Identify multiples Common multiples						
4. Recognize number patterns	(See IX - 4)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
I. Numbers and Numerals					
A. Numbers					
1. Recognize whole (cardinal) numbers					
To 9					
To 99					
To 999					
To 9,999					
To 99,999					
To 999,999		242-243(10) 69(10)/DT20(2)			
To 9,999,999		244-245(10) 69(10)/DT20(1)			
2. Identify special concepts related to Whole numbers					
Ordinal number					
Even and odd numbers			280(10) 78(10)/DT23(9)		
Prime numbers			284(9)		
Number pair	208(10) 58(3)	233(10)			
Identity element					
--Zero (addition)					
--One (multiplication)					
Fractional numbers					
3. Recognize fractional numbers					
Half					
Thirds					
Fourths					
Fifths					
Sixths					
Sevenths					
Eighths					
Ninths					
Tenths					
Twelfths					
Numbers greater than 1					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
B. Numerals 1. Recognize numerals for whole numbers Expanded numeral form Compact numeral form --Periods Roman numerals		242-245(10) 68-9(7) 252(10)			
2. State the place value of a digit		242-244(10) 68-9(10)/DT20 (3)			
3. Recognize numerals for fractional numbers a/b form Mixed numeral form Decimal (decimal point) --Money Equivalent fractions --Numbers less than one --Numbers more than one		237-239(10) 66(10)/DT20(5)			
4. Regroup numerals through hundreds		224-225,232-235, 246-247(10) 62-5(10)/DT19-20 (10)			
C. The Number-Numeral Distinction 1. Identify more than one name for same number Equation Algorism					
2. Rename addends and sums					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
3. Rename factors and products					
D. Ordering 1. Order 3 or more whole numbers in a counting sequence By ones to 9 99 999 9,999 By twos By threes By fours By fives By tens to 99 999 9,999 By hundreds to 999 9,999 By thousands By millions					
2. Order whole numbers using relational symbols <,>and =					
3. Order fractional numbers					
E. The Number Line 1. Represent order of whole numbers					
2. Represent multiples of whole numbers (skip counting)			279(10) 77(10)		
3. Represent order of fractional numbers					
4. Identify directions Left-right up-down					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 299	300 - 316
5. Represent operations					
Addition					
Subtraction					
Multiplication	191,197(10) 55(4)				
Division	197(8)		271,273(8)		
Inverse operations					
--Addition-subtraction					
--Multiplication-division	197(10)		270(10) 75(10)		
Rounding		240-241(10) 67-9(10)/DT20 (5)			
6. Use vertical number line					
7. Recognize number plane				296-299(10) 85-6(10)/DT25 (5)	316(10) 94(10)
8. Represent properties					
Associativity					
Commutativity					
F. Concrete Models for Numbers and Numerals					
1. Represent whole numbers					
Abacus		242-244(8) 68-9(5)			
Sets & structured bundles					
Number rods					
Place-value chart					
2. Represent fractional numbers					
Set-subset					
Region-subregion					
Number bars					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
II. Mathematical Operations					
A. Properties					
1. Recognize properties of mathematical operations					
Associativity					
--Addition					
--Multiplication	209(0)		256-257(10)		
Commutativity					
--Addition					
--Multiplication					
Noncommutative operation					
--Subtraction					
Common factor (distributive) property					
--Multiplication			253-255(10) 71-2(10)/DT22 (6)		
--Division					308-309(10) 91(10)/DT27(3)
Identity elements					
--Zero (addition)					
--One (multiplication)					
Closure					
--Addition					
--Multiplication					
Inverse operations					
--Addition-subtraction					
--Represented by sets					
--Multiplication-division	196-197(10)		270(10) 75(10)/DT23(6)		DT26(6)
B. Development of Addition-Subtraction with Whole Numbers					
1. Recognize related terms					
Addend					
Sum					
Difference					
Missing addend					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
2. Recall basic facts Addition Subtraction Families of facts					
3. Recognize models for addition Union (joining) of sets Number rods Abacus					
4. Add whole numbers to millions					
One addend less than ten					
Tens					
Tens and ones					
--No renaming					
--Renaming ones as tens		221(10) 62(5)/DT19(3)	DT19(2)		
Hundreds					
Hundreds and tens					
--Renaming tens as hundreds		222-223(10)			
Hundreds, tens, and ones					
--No renaming					
--**Renaming ones** as tens		246(10) DT19(3)			300-301(4) 87(2)/DT26(1)
--Renaming tens as hundreds		224-225(10) 63(6)/DT19(3)			300-301(10) 87(3)
--Renaming both tens as hundreds and ones as tens		234-235,246-247(10) DT19(2)			300-301(2) DT26(4)
Thousands, hundreds, tens, and ones					
--Renaming hundreds as thousands		248-249(10) 70(1)/DT20			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
--Renaming ones as tens		70(3)/DT20(1)			
--Renaming tens as hundreds		DT20(1)			
Millions					
--Renaming ones as tens		244(4)			
Three or more addends	192-193(10) 54(10)/DT17(3)				
Mental computation					
5. Recognize models for subtraction					
Separation of subset from set					
Number rods					
Abacus					
Missing addend					
6. Subtract with whole numbers to millions					
One addend less than ten					
Tens					
Tens and ones					
--No renaming		226(10) DT19(2)			
--Renaming tens as ones		226-228(10) 64(10)/DT19(3)			
Hundreds					
Hundreds and tens					
--No renaming					
--Renaming hundreds as tens		230-231(10)			
Hundreds, tens, and ones					
--No renaming					
--Renaming tens as ones					300(10) 87(2)/DT26(3)
--Renaming hundreds as tens		232(10) 65(9)/DT19(1)			
Thousands, hundreds, tens, and ones					
--No renaming		DT20(1)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
--Renaming thousands as hundreds		249(10) 70(2)/DT20(1)			
Millions					
--Renaming thousands to hundreds					
Mental computation					
C. Development of Multiplication-Division with Whole Numbers					
1. Recognize related terms					
Factor					
Product					
Quotient					
Missing factor					
Remainder			75(10)		
2. Recall basic facts					
Multiplication	190-195,198-201(10) 53-4(10)/DT17(10)				
Division	196(10) 56(10)				
Families of facts	197(10)		75(4)/DT23(10)		
3. Recognize models for multiplication					
Addition-equal addends	192-193(10) 54(10)/DT17(3)				
Set of equivalent sets	190 53(9)				
Pairing elements of two sets (cross product)	204-207(10) 58(6)/DT18(4)		256(4)		
4. Multiply whole numbers					
Zero as a factor					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
One as a factor					
Two as a factor	190-193(10) 53-4(10)/DT17 (2)				
Three as a factor	190-193(10) 53-4(10)/DT17 (4)				
Four as a factor	190-193(10) 53-4(10)/DT17 (3)				
Five as a factor	190-193(10) 53-4(10)/DT17 (3)				
Six as a factor	194-195(10) 55(10)/DT17(5)				
Seven as a factor	198-199(10) DT17(4)				
Eight as a factor	200(10) 57(6)/DT17(3)				
Nine as a factor	201(10) 57(5)/DT17(2)				
5. Multiply numbers to three places (one factor less than ten)					
Tens	209(10)				
Tens and ones					
--No renaming	210-211(10) 59(2)/DT18(1)		254,258(10) 71(10)/DT22(3)		
--Renaming ones as tens	212-216(10) 59(8)/DT18(4)		262-265(10) 73(10)/DT22(5)		
Hundreds			257(10)		
Hundreds and tens					
--No renaming			259(10)		
--Renaming tens as hundreds					
Hundreds, tens, and ones					
--No renaming			266-261(10) 72(10)/DT22(2)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 299	300 - 316
--Renaming ones as tens			74(6)/DT22(3)		302-303(10) 88(2)
--Renaming tens as hundreds			74(1)/DT22(2)		302-303(10) DT26(1)
--Renaming both tens as hundreds and ones as tens					302-303(10) 88(6)/DT26(4)
6. Recognize models for division					
Repeated subtraction			271-273(10)		306-307(10) 89-90(10)/DT27 (3)
Separation of equivalent subsets from a set			76(8)		306-307(2) 89,90(6)/DT27 (3)
Missing factor			270(10) 75(10)		
7. Divide with whole numbers					
Two as a factor	196(6) 56(1)				
Three as a factor	196(8) 56(2)				
Four as a factor	196(9) 56(1)				
Five as a factor	196(4) 56(2)				
Six as a factor	196-197(10) 56(3)				
Seven as a factor	198-199(10)				
Eight as a factor	200(0)				
Nine as a factor	201(0)				
8. Divide numbers to three places with single digit divisor					

139

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
1-digit quotient					
--No remainder	196,199(10)		270-271(10) 75(10)		
--Remainder			272-277(10) 76-7(10)/DT23(5)		93(6)/DT27(2)
2-digit quotient					
--No remainder					310-312(10) 92(10)/DT27(4)
--Remainder					313(10) 93(8)/DT27(2)
D. Addition and Subtraction Algorisms					
1. Use counting algorism					
2. Use horizontal-form algorism					
Equations					
3. Use vertical-form algorism					
Expanded numerals		221,234,246, 226(10) 62,64,70(10)			
Column diagrams		222,224,227-228,230,234(10)			
Three-step form		221-224,227, 230-231,232(10)			
Four-step form		224-225,234-235, 247(10) 63(8)			
Working (short) form		221,223,225,235, 246-248(10) 62-5(10)/DT19-20 (10)			
4. Estimate sums and differences		240-241(6) 67(10)/DT20(4)			
5. Check addition and subtraction					301(10) 87(8)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 299	300 - 316
E. Multiplication and Division Algorisms					
1. Use horizontal-form algorism for multiplication					
Equation	194-195,197-201,209-210, 212(10) 57(11)/DT17(9)				
2. Use vertical-form algorism for multiplication					
Expanded numerals	210,212(10)		258-260,262 (10) 72(3)		
Three-step method	211,213(10)		258-259,262, 264(10) 73(6)		
Four-step method			266,261(10)		302-303(10)
Working (short) form	213(9) 58(10)/DT17-8(10)		258-259,261-263, 265(10) 72-3(10)/DT22 (10)		303(10) 88(10)/DT26(5)
Common factor rule			254-255(10) 71-4(10)/DT22(3)		
3. Use horizontal-form algorism for division					
Equation	196-197(10) 56(5)		270-271(10)		
4. Use vertical-form algorism for division					
Working form-single digit quotients					
--No remainder	196(10) 56(5)				
--Remainder			272-277(10) 76(10)/DT23(5)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 299	300 - 316
Working-form-2-digit quotients					
--Scaffold method					
---No remainder					310-312(10) 92(8)
--Pyramid method					
---No remainder					312(10)
---Remainder					
--Regular (compact) method					
---No remainder					312(9) 92(10)/DT27 (4)
---Remainder					313(10) 93(8)/DT27 (4)
--Common factor rule			276(10) 76(10)		308-309(10) 91(10)/DT27(3)
5. Check division by multiplying					311(10) 93(4)
F. Operations with Fractional Numbers					
1. Rename fractions (equivalent fractions)					
2. Add fractional numbers with common denominators (sums less than one)					94(3)
3. Represent order of fractional numbers on number line					
4. Relate fractional numbers to division					
G. Extensions					
1. Recognize alternative algorisms					
Addition					
Subtraction					
Multiplication-Division					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
2. Translate secret codes					
Addition & Subtraction					88(10)
Multiplication & Division	189(10)				
Number plane					94(10)
III. Sets					
A. Recognition					
1. Recognize set from description or roster					
Member of a set					
Brace or ring notation					
2. Recognize relations between sets					
Subset					
Equivalence	190,192(10) 53(9)				
Nonequivalence					
3. Identify special sets					
Empty set					
Finite set					
Infinite set			280(0)		
Set of equivalent subsets	190,192(10) 53(9)				
Set of ordered pairs (functions)	208(10) 58(3)	233(10)			
Sets of points (geometric figures)				287(10) 85(10)/DT25 (5)	94(4)
4. Identify cardinal number property of sets					
B. Operations					
1. Perform operations with sets					
Matching members					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
--One to one					
--One to many					
Joining two sets (union)				(II-B - 3 & II-C - 6)	
Separating subset from set				(II-B - 5 & II-C - 6)	
Identifying cross product of two sets	204-207(10) 58(6)/DT18(4)				
Comparing sets					
2. Recognize properties of set operations					
Associativity of union					
Commutativity of union					
3. Relate set operations to operations on numbers					
Joining sets					
--Addition					
--Multiplication					
Separating sets					
--Subtraction					
--Division					
IV. Problem Solving					
A. Mathematical Operations					
1. Write number sentence describing verbal problem			269(5) 74(2)		304-305(10)
2. Perform operations related to sets	(See III-B - 1)			(See III-B - 1)	
Joining					
Separating					
Comparing					
3. Solve verbal problems involving					
Five-step method			269(5)		304(7)
Addition & Subtraction		223,235-236, 239,246-249 (10) 64-5,70(10)			305(3) 87(3)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
Multiplication-Division	202,206-207, 213,216(10) 57,59,61(10) DT18(3)		261,267,269, 276-277(10) 73(5)		302-305(10) 90(2)
Two-stage problems			269(5) 74(2)		
B. Mathematical Concepts					
1. Solve verbal problems involving					
Money	202-203(10) 61(1)	237-239(10) 62,64,66(10)	257,267,277, (10) 73(2)		
Time			263(9)		
Rates					
Weight	61(1)/DT18(1)		73-4(6)		
Distance		247(2)	73(1)	291(5)	
Social activity					87(1)
Science					305(7)
Miscellaneous	202-203,206- 207(10) 61(1)/DT18(1)	223(2) 64-5,70(8)	261,267,269, 277(10) 73-4(3)		304(7)
V. Number Sentences					
1. Write number sentence to describe word problem	(See IV-A - 1)			(See IV-A - 1)	
2. Complete sentences using symbols					
>,<,=					
=					
+,-	61(1)				
x	61(1)				
÷	61(1)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
3. Decode sentences with symbols					
+,-	(See II)				
x,÷	(See II)				
÷	(See II)				
>,<					
=	(See II)				
□,⬡	(See II-A,B,C)				
4. Use parentheses ( )					
To group addends					
To group factors			256-257(10) 71-2(10)/DT22 (6)		
5. Solve open sentence by identifying					
Missing addend or sum		248(10) 70(4)/DT19-20(10)			
Missing factor or product --Multiplication sentence	190-192,194-201,209-210, 212(10) 53-4(10)/DT17-18(10)				
--Division sentence	196-197(10) 56(10)				
6. Recall families of facts					
Addition-subtraction					
Multiplication-division	197(10)				
7. Read-write sentences related to					
Money	(See also IV-A - 1; VII - 1)	224,238-239, 331(10) 66(10)		(See also IV-A - 1; VII - 1)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 299	300 - 316
Capacity (liquid)	(See also IV-A - 1; VII - 1)			(See also IV-A - 1; VII - 1)	
VI. Applications of Mathematics					
1. Apply mathematical concepts and skills to					
Science					
--Animals					
--Human body					
--Space					305(7)
--Distance		247(2)			
Social studies & Misc.					304(7)
--History					
--Pollution	203(7)				
Sports					
2. Apply mathematical concepts and skills to	(See IV-B - 1; VII - 1)			(See IV-B - 1; VII - 1)	
Capacity					
Time					
Money					
Linear Measurement					
VII. Measurement					
1. Recognize and use systems of measurement					
Capacity					
--Cup					
--Pint					
--Quart					
--Gallon					
Time					
--Calendar					
---Day	215(4) 60(1)				
---Week	216(2)		263,277(4)		
---Month	215(4) 60-1(2)/DT18 (1)		263(3)		
--Clock-Tell time to					
---Hour					
---Half hour					
---Quarter hour					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
---Nearest 10 minutes					
---Nearest 5 minutes					
---Minute					
---"Past"					
---"To"					
Money					
--Cent-penny, nickle, dime					
--Coins to quarters		62(3)			
--Coins to half-dollars					
--Coins to dollar (bill)					
--Coin values, making change		237(10)			
--Symbols					
---¢		237(10)			
---$		237(10) 66(10)/DT20 (5)			
Length					
--Unit				82(4)	
--Yard	214(10) 60(5)/DT18 (1)		73(2)		
--Foot	214-215(10) 60(9)/DT18 (1)				
--Inch	214-215(10) 60(10)/DT18 (2)				
--Half inch					
--Quarter inch					
--Centimeter				285(2)	
--Use of ruler					
Area					
--Square unit				290-291(10) 82(6)/DT24(3)	
---Square inch				290-291(7) 82(2)	
Volume					
--Cubic unit				294-295(10) 84(8)/DT24(6)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
---Cubic inch					
Weight				84(4)	
--Pound	216(2)				
--Ounce	216(2)				
Quantity					
--Dozen	215(4) 60-1(2)/DT18 (2)				
VIII. Geometry					
A. Nonmetric					
1. Identify basic concepts					
Point					
Curve					
Line					
--Parallel lines				285-286(7) 79(2)/DT24 (3)	
Line segment				80(1)	
--End points					
--Parallel segments				285-286(7) 79(2)	
Ray					
--End point					
Angle					
--Union of two rays					
Congruent angles				286(4) 80(4)	
--Right angle				287(10) 80(9)	
Plane				285(4) 79(9)/DT24 (4)	
--Curve in a plane					
--Line in a plane					
--Line segment in a plane					
2. Recognize geometric figures					
Polygon (general definition)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
--Sides					
--Corner points				292(1)	
Triangle				287(5)	
				80(1)	
Square				287(4)	
				80(1)	
--Diagonal				289(1)	
Rectangle					
Hexagon					
Circle					
				80(1)	
--Center					
--Radius					
--Diameter				289(1)	
3. Construct geometric figures					
Circle					
Angle					
--Right angle					
Line segment					
Triangle					
Patterns of figures					
4. Recognize regions					
Triangular					
Square					
Rectangular					
Circular					
5. Identify topological concepts					
Open curve					
Closed curve					
--Simple closed curve					
--Points on closed curve					
--Points inside				286-287(10)	
--Points outside				286-287(10)	
6. Identify simple closed surfaces					
Cylinder				293(10)	
				83(5)/DT85(3)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
Points in a number plane				296-297(10) 85(10)/DT25 (5)	
Lattice arithmetic				296-297(10) 85(10)/DT25(5)	
3. Measure length Unit of length (general)	(See also VII - 1)				
Estimate length --Nearest inch				82,84(5)	
--Nearest half-inch				82(4)	
--Nearest quarter-inch					
--Nearest centimeter					
--Nearest foot					
--Nearest yard					
4. Measure volume Unit of volume (general) --Cubic unit	(See VII - 1)			(See VII - 1)	
IX. Logical Thinking 1. Recognize quantified statements: "all"-"some"-"none"					
2. Represent if-then statements using set and subset					
3. Complete simple if-then statements (rates)					
4. Recognize patterns Number	194-195,199-201,208,220(10) 58(3)	221,233(10)	254-255,279,284(10) 77-8(10)		309(10)
Geometric					
X. Functions and Graphs 1. Identify functions and rules					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 299	300 - 316
Sphere				293(10) 83(5)/DT85(1)	
Cube				292,294-295 (10) 83(5)	
--Edge				292(1)	
--Face				292(2) 83(3)	
--Corner points				292(1)	
7. Recognize operations, relations, and properties					
Comparison of regions (fractional numbers)					
Transformation of figures					
--Slides					
--Flips				288(9) 81(4)	
--Turns					
Symmetry				288-289(10) 81(10)/DT24(4)	
Congruent figures				288-289(10) 81(10)/DT24(4)	
B. Metric					
1. Recognize area					
Fractional parts of subregions					
Unit of area					
--Square unit				290-291(10) 82(6)/DT24(3)	
Area of regions					
--Triangular					
--Square					
--Rectangular					
--Circular					
2. Identify coordinate system-number pairs					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
Addition rules		233(4)			
Subtraction rules		233(2)			
Multiplication rules		233(3)			
Division rules	58(2) 208(4)	233(2)			94(1)
Number pair TV	58(1) 208(4)				
2. Interpret data					
Bar graph				86(3) 297(10)	
Line graph (number plane				86(2)/DT25 (5)	
3. Represent data					
Bar graph				297(7)	
Line graph (number plane)				296-297(10) 86(3)/DT25 (5)	
4. Recognize symbol for measurement function: m ( )					
XI. Probability and Statistics					
1. Identify statistical and probabilistic concepts					
Probability of simple events represented by fractional numbers					
Combinations determined by means of cross-product	204-207(10) 58(6)/DT18 (4)				
2. Interpret bar graphs	(See X - 2)			(See X - 2)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 3 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 299	11 300 - 316
XII. Number Theory					
1. Recognize special sets of numbers					
Prime numbers					
--Prime number patterns					
Even and odd numbers			280(10) 78(10)/DT23 (9)		
2. Identify factors					
Common factor			253(6) 71-2(4)/DT22 (2)		91,94(10)
3. Identify multiples					
Common multiples			278-279(10) 77(2)/DT23(10)		
4. Recognize number patterns				(See IX - 4)	

HOUGHTON MIFFLIN STRUCTIONAL OUTCOMES
GRADE 4

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
I. Numbers and Numerals						
A. Numbers						
1. Recognize whole (cardinal) numbers to billions						
To 9	4(7)		48(2)			
To 99	4(2)		88(4)			157(6)
To hundreds	6-7(10)					
To thousands	16-7,20-1(10)					
			DT7(1)			
To millions	22-3(10)					
			DT7(1)			
To billions						175(10) 46/DT16(8)
2. Identify special concepts related to whole numbers						
Even and odd numbers						157(2)
Prime numbers						168-171(10)
--As factors	(See XII - 2)					170-171(10) 45(7)
Composite numbers						
Square numbers						
Number pairs	(See X - 1)	34-5,40-1, 58(10) 11(10)/DT3 (4)	78(9) 23(8)	118(10)		
Identity elements						
--Zero (addition)		37(1)				
--One (multiplication)					135(0)	
Abstract number system						
Clock arithmetic	(See II-C - 5)					
Ordinal						
Nominal						
Cardinal						
3. Recognize fractional numbers						
Less than one						
--Regions					128,132,137- 139,141,155 (10) 34(8)/DT11, 14(3)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Sets					125,126-127, 140(10) 34(8)/DT11, 14(5)	
Greater than one						
Decimal fractions	(See money)					
--Tenths						
--Hundredths						
B. Numerals						
1. Read and write whole numbers in different forms						
Compact form	6-7,16-17,20-23,26,27(10) 6,8(8)/DT2(2)		26(3)			174-175,178(10) 49(6)
Expanded form	6-7,16-7,20-3,27(10) 6(6)/DT2(2)	42,46-7,51, 58(10)	26(2)/DT7(5)			176-178,187(10) 47(9)/DT16(3)
Exponent						
Roman numerals	28(10)					
Base 8						180-183.187(10) 48(10)
2. Identify the value of a digit						18/DT16(3)
Face value	7(0)					
Place value						
--To tens		51(2)				47(3)/DT16(2)
--To hundreds	6-7,22(10) 6(5)	51(1)				46-7(10)/DT16(1)
--To thousands	6-7,16,20-21(10) 6,8(10)/DT2(2)	51(2)				47(4)/DT16(2)
--To millions	23-5(10) 8(3)/DT2(1)					174(10) 46(5)/DT16(2)
--To billions						175(10) 46(2)/DT16(1)
Total value (concept)	6-7(10)	54-5,58(10)				
3. Recognize numerals for fractional numbers						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
a/b	(See also II-F - 3)				126,134,144, 146(10) 38(10)/DT13 (4)	
Expanded	6-7,16,20-1, 23(10)					
Mixed					144-145(10) 138(10)/DT12 (3)	
Decimal --To tenths --To hundredths						
Equivalent fractions					136-141,146 155(10) 37/DT12,14(9)	
--Simplest form					140(10)	
4. Regroup numbers through thousands		42-9,50-1(10)				
C. Number-Numeral Distinction						
1. Identify more than one name for same number						
Equation	5,6,27(10) 2,4,6(10)/DT 2(9)				125,146-147 (10)	
Algorism						
2. Rewrite fractional numbers with specified denominators					134,135,136- 141,146,155(10) 41(4)/DT12(6)	
3. Recognize two forms of a number in a story problem						
D. Ordering						
1. Use <, =, > symbols to compare						
Whole numbers	8-9,13,14(10) 7(3)	39(9)			142(10)	
Fractional numbers						49(6)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 28	29 - 60	61 - 92	93 - 124	125 - 156	157 - 188
2. Use nearest, between, to compare whole numbers	15,18(10) 5(10)					
E. The Number Line						
1. Represent numbers						
Whole numbers	9,15,18-9(10) 7(3)/DT2(2)					
Fractional numbers					129,139,144-146(10) 35(6)/DT11(4)	
2. Represent operations						
Addition		30-1,40(10)			133-135(10) 36(10)/DT12(6)	
Subtraction		30-1,41(10)				
Multiplication			62-3,71(10)		36(4)	
Division			62-3,71(10)			
Inverse operations		30(4)	63(10)			
Rounding	15,19(10) 5(6)/DT1(3)					
3. Represent properties						
Associativity						
Commutativity		31(4)				
4. Represent numbers on						
Vertical number lines						
Circular number line	(See II-B - 7)					
Number planes	(See VIII-B - 4)					
F. Concrete Models						
1. Use concrete models for whole numbers						
Abacus	7,16,20-21(10) 2,6,8(10)					174-175,180-182 (10) 46(4)
Sets	4,6,8(10)					
Number rods					138(10)	
Place value chart	(See I-B - 3)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
2. Recognize concrete models for						
Fractional numbers	(See I-A - 3)					
Sets and subsets						
Regions and subregions						
II. Mathematical Operations						
A. Properties						
1. Recognize properties of mathematical operations						
Associativity						
--Addition		32-3,58-9(10) 10(10)/DT3(1)				
--Multiplication			24(10)/DT7(1) 82-3,91(10) 24(10)/DT6(3)			49(1)
Commutativity						
--Addition		31,59(7) 10(8)/DT3(1)				49(1)
--Multiplication			70,91(10) 20(1)/DT(1)			
Common factor (distributive) property						
--Whole numbers			72-4,91-2(10) 21(10)/DT7(1)			166-167,187(10) 49(1)
--Fractional numbers						
Nonassociativity						
--Subtraction						
--Division						
Noncommutativity						
--Subtraction		31(2)				
--Division						
Inverse operations						
--Addition-subtraction		30-1(8) 9(6)/DT3(4)				
--Multiplication-division			68-9(10) 20(10)			
Identity elements	(See I-A - 2)					
--Zero in addition						
--One in multiplication					135(0)	
Zero as a factor					135(2)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4(continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 28	29 - 60	61 - 92	93 - 124	125 - 156	157 - 188
B. Development of Addition and Subtraction						
1. Identify related terms						
Addend		29,31,36,40-41,50,59(10) 10(10)/DT3(1)	62(10)			
Sum		29(6) 9(8)				
Difference (missing addend)		29(6) 9(9)	40-1,58(10)			
Solution	14(10)					
2. Recall basic facts						
Addition		29,36,39(10)				
Subtraction		29,36,39(10)				
Families of facts		31,36,58(10) 9(6)				
3. Recognize models for addition						
Union (joining two sets)	(See III-B - 3)					
Number rods						
Abacus						
4. Add whole numbers to billions						
Tens and ones		29,36,42(10)				
--No renaming						
--Renaming		40-1,44,58-9 (10) 12(10)/DT3(1)	DT7(5)		142(10)	
Hundreds, tens and ones						
--No renaming		42-3(10) 13(5)/DT4(3)				
--Renaming		44-5,56-9(10) 13(7)/DT4(5)	26(1)			
Numbers of unlimited size						
--No renaming	8(8)					
--Renaming		48(10) 14(6)/DT4(3)				
Three or more addends		51,57(10) 26(5)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
5. Recognize models for subtraction						
Separation of subsets from sets	(See III-B - 3)					
Number rods						
Abacus						
6. Subtract with whole numbers to billions						
Tens and ones						
--No renaming		29,42-3(6)				
--Renaming		50-1,53,56, 58(10)	DT7(5)			
Hundreds, tens and ones						
--No renaming		49-51(10) 13(1)/DT4(2)				
--Renaming		46-7,56-8(10) 13(6)/DT4(5)	26(4)			
Numbers of unlimited size						
--No renaming						
--Renaming		49(10) 14(6)/DT4(2)				
7. Add & subtract numbers represented on						
12 - clock						
7 - clock						
C. Development of Multiplication-Division with Whole Numbers						
1. Recognize related terms						
Factor					142(3)	160,164,187, 176(10)
Product						
Quotient (missing factor)			62(10)		142,149(10) 39(10)	
Remainder						
Missing digit						
2. Recall basic facts						
Multiplication			76-7(10) 22(7)/DT6(4)		DT14(9)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 28	29 - 60	61 - 92	93 - 124	125 - 156	157 - 188
Division			76(8) 22(6)/DT6(4)		DT14(4)	
Families of facts			71,91(10) DT5(3)			
3. Recognize models for multiplication						
Addition of equal addends			62-3(10) 17(6)/DT5(4)			
Pairing elements of two sets			64-7(10) 26(2)			
Joining sets of equivalent subsets	(See III-B - 3)					
4. Multiply whole numbers to four places						
Zero as a factor			70(1)			
One as a factor			70(1)			
Ten as a factor			82-3(10)			178(10)
One hundred as a factor			82-3(10)			178(10)
Tens and ones						
--By 1-digit factor			82-3,84-6(10) 26(10)			
--By 2-digit factor			82-3(10)			
Hundreds, tens and ones						
--By 1-digit factor			82-3(10)			
--By 2-digit factor			82-3(10)			
Thousands, hundreds, tens and ones						
--By 1-digit factor						
5. Recognize models for division						
Subtraction of equal addends			62(10)			
Separation of equivalent subsets from a set					148(10)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
6. Multiply numbers represented on						
12 - clock						
7 - clock						
7. Divide whole numbers to four places						
Tens and ones						
--1-digit divisor					148-149(10) 39(10)	
--2-digit divisor						
Hundreds, tens and ones						
--1-digit divisor						
--2-digit divisor						
Thousands, hundreds, tens, and ones						
--1-digit divisor						
--2-digit divisor						
D. Addition & Subtraction Algorisms						
1. Use horizontal form algorism						
Equation	14(3)	45(9)	(See II-B - 4,7)			
2. Use vertical form		42-9,50-1				
algorism		52(10)				
Expanded numerals		42,46-7(10)				
Column diagrams		51(10)				
Three-step form		43-4(10)				
Four-step form		43-4(10)				
Working (short) form		43,46-7(10)				
Flow chart		60				
3. Estimate sums and differences		53(10) 15(10)				
4. Check addition and subtraction		50(10) 14(10)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
E. Multiplication & Division Algorism						
1. Use horizontal (equation) form for multiplication			75(10)			
2. Use vertical (working) form for						
Factors less than 10			74(10)			
Three-step method			85-6(10) 25(10)/DT6 (5)			
Four-step method						
Short (compact) form			86(10) 26(10)/DT6 (5)			
Common factor rule			72-4(10) 21/DT5(4)			166-167,187(10)
Flow chart						
3. Use horizontal (equation) form for division			74(10)			
4. Use vertical (working) form for division						
Divisor and quotient less than 10			74(10)			
Scaffold method (two-stage)						
Pyramid method						
Common factor rule	(See II-A - 1)					
5. Estimate products and quotients						
6. Check division and multiplication						
F. Operations with Fractional Numbers						
1. Recognize related terms						
Numerator					130,155(10) 35(4)	
Denomenator					130,155(10) 35(4)	
Decimal point						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES.	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
2. Rewrite fractions with specified denominator	(See I-C - 2)			DT14(4)		
3. Rename a fractional number						
a/b form					134,146(10) 37(10)	
Decimal form	(See I-A - 3)					
4. Add-subtract fractional numbers						
Less than one						
--Common denominators					133-135,142, 156(10) 36(10)	
--Different denominators						
Greater than one						
--No renaming						
--Renaming						
Decimal fraction						
--To tenths	(See I-B - 3)					
--To hundredths						
5. Multiply fractional numbers						
A unit fraction by a whole number					132,135(10) 36(4)/DT11(9)	
A decimal fraction by a whole number						
6. Interpret fractions as division					146-149(10) 38-9(10)/DT13 (6)	49(10)
G. Extensions						
1. State the function rule and complete a set of ordered pairs						
Addition						
Subtraction						
Multiplication						
Division						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
2. Recognize alternate algorism						
Lattice method						
3. Construct flow charts						
III. Sets						
A. Recognition						
1. Recognize sets from description or roster	1(10) 1(3)					
Member of a set	1,4,27(10)				125(10)	157-159,187(10)
Brace notation	1,4,27(10)					157,158,187(10)
2. Recognize relations between sets						
Subset	2,26-7(10) 1(3)/DT1(2)		61(8)			158(10)
Equivalence	3,5,27(7)		61(2)			
Nonequivalence	3,27(2)	(See also III-A - 2)				
Equality	(See also III-A - 3)					
3. Recognize special sets						
Empty sets	2,3,27(9)					
Equal sets	3,27(10)					
Finite sets						157(8)
Infinite set						157,160(2)
Set of equivalent subsets	(See III-A - 2)					
Set of ordered pairs		34-5,40-1(10)				
Sets of points	(See VIII-A - 1)					
4. State cardinal number property of set			88(4)			157(6)
n( ) notation	1(8)		66-7(4)			
B. Operation						
1. Recognize related symbols						
Venn diagrams						158,159,162(10) 42(5)
∪,∩	4,26,27(10)					158(6) 42(9)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
2. Perform operations with sets						
Matching members						
--One to one						
--One to many		64-7(10)	80-1(10)			
Comparing sets	8(6)	29(6)			126-127,131-134,136,140,148-149,155 (10)	
Joining sets		29,32(10)	61(10)			
Separating subsets from sets	(See II-B - [illegible])					
Cross multiplying two sets			64-7(10) 19(6)/DT5(2)			
Intersection of two sets						158-159(10) 42/DT15(2)
3. Relate set operations to operations on numbers						
Joining						
--Addition		29(6)			134(10)	
--Multiplication			17(6) 61(0) 17(6)			
Separating						
--Subtraction		29(6)				
--Division			61(10)			
--Fractions						
Cross multiplying						
--Multiplication			64-7(10) 19(10)			
Intersection						
--Division			61-2(10)			
--Subtraction		29(10)				
4. Illustrate mathematical properties						
Associativity		32(4)				
Commutativity						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
5. Use Venn Diagrams to represent						
Subsets						159(10)
Intersections						159(9)
IV. Problem Solving						
A. Mathematical Operations						
1. Solve verbal problems involving						
Addition & Subtraction	14(10) 8(2)	38-9,43,44,46, 47,48,51-2(10)	17(2)		1(4)	
Multiplication & Division			18(10)		41(3)	
Two sets of sets			88-9(10)			172(6)
Five-step method		38(5)	88-9(10)		152(6)	172(6)
Rates - "per"			80-1(10) 23(10)			
B. Mathematical Concepts						
1. Solve verbal problems related to						
Money		52,54,55,58 (10) 16(4)/DT4(3)		93,110(7)	152(3)	
Time	25(1)				152(4)	
Weight					152(3)	
Speed, time, distance					153(2)	
Social activities	24(6)				131,152-153 (10)	
Linear measurement				110(7)		172(3)
V. Number Sentences						
A. Identify Open and Closed Sentences	12,13(10)					
1. Decode symbols in number sentences						
<,>,=	14,27(7)					
+,-	13,14,17(10) 6(6)	(See II-B - 4,6)				
x,	(See II-C - 4,7)					
n (as a place holder)	(See III-A - 4)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
2. Read and/or write number sentences involving						
Fractions	(See II-F - 4-6)					
Exponents	(See I-B - 1)					
Money		57(6)	(See IV-B - 1, VII - 2)			
Metric system of measure						
Logic statements	(See IX)					
Word problems	10,19(10) 4(6)					
Sets	8(6) 3(3)					
Number words	10,16(10) 3,4(10)					
3. Use <,>,=,+,÷,x,-, or a numeral to make an open sentence true	10,11,13-14, 27(10) 3,4(10)/DT1(6)	39(10)			142(10)	
4. Use ( ) to show mathematical properties						
Associativity	(See II-A - 1)					
Common factor rule	(See II-A - 1)					
Solve equations and inequalities						
VI. Applications of Mathematics						
1. Apply mathematical concepts & skills to						
Science			87(7)			165(7)
Social studies	24(6)	52(8)				179(7)
Linear measurement	(See IV-B - 1)					
Probability						
Capacity						
Time	(See IV-B - 1)					
VII. Measurement						
Recognize and use systems of measurement						
1. Capacity						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 28	29 - 60	61 - 92	93 - 124	125 - 156	157 - 188
--Quart --Pint --Liter						
2. Money --Coins to dollars		54-55,56, 58(10) 16(7)				
Bills to $5.00, $15.00		56-7(10) 16(4)				
3. Length --Unit length --Inch --Feet --Yard --Mile				102(0) 102-103(5) 30(2) 110(8)		
Centimeter				102-105,108 (10)		
Meter Kilometer						
4. Area --Unit square				114-117,123 (10) 32(9)		
--Square inch --Square mile						
5. Volume --Unit cube --Cubic inch						
6. Weight --Pound --Kilogram						
7. Temperature --Fahrenheit degree			87(6)			
8. Time	(See II-B - 7, II-C - 6)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
VIII. Geometry						
A. Nonmetric						
1. Identify basic concepts						
--Points	(See also VIII-B - 4)					
--Naming				94(7) 27(1)/DT8(1)		
Lines						
--Naming				94(4) DT8(1)		
--End points				94(1)		
--Parallel				107,120(10)		
--Perpendicular				30(5)/DT9(1) 99(0)		
--Intersection						158(1)
Line segments						
--Naming				94(0) 27(3)/DT8(2)		
--End points				94(10)		
--Parallel				107(2)		
--Perpendicular						
--Intersecting a plane						
Rays				98-9(3) 29(3)		
Angles				29(3)/DT8(3)		
--Intersection of two rays				98-9(8)		
--Intersection of two planes						
--Right angles				99,101(8)		
--Equal angles				98-9(4) 29(1)		
Planes				106(2)		
--Parallel						
--Points in a plane						
--Lines & line segments in a plane				106(4)		
--Intersecting				106(4)		
2. Recognize geometric shapes						
Circle				93(2)		
--Center				104(0)		
--Radius				104,105,123 (10) 30(1)/DT9(1)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
--Diameter				104(0) 30(1)/DT9(1		
Ellipse						
Triangle				93,108(10)	27(1)	
Square				93,109,114(10) 31(1)/DT9(1)	27(1)	
Rectangle				109,114-116(4) 31(1)/DT9(1)		
Parallelogram				109,114-116 (10) 31(1)		
Rhombus				109(3) 31(1)		
Hexagon				105(1)		
Polygon				108-109(10)		
Quadrilateral				108-109,124 (0) 31(3)		
3. Recognize simple closed surface						
Cone						
--Base						
--Height						
Cylinder						
--Base						
--Height						
Sphere						
--Center						
Cube						
--Edge						
--Face						
--Vertex						
Pyramid						
--Square						
--Triangular						
4. Construct geometric figure						
Line segment				94,102(7) 27(1)/DT8(1)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Circle (using a compass)						
Ellipse						
Right angle (paper folding)				99(1)		
5. Recognize regions						
Triangular				113(0)		
Square				113(0)		
Rectangular				109(2)		
Circular				113(0)		
6. Identify topological concepts						
Open curve				112(1) DT9(1)		
Closed curve				112(3) DT9(3)		
--Simple closed				112(2)		
--Segment of				94,113(7)		
--Vertex				113(7)		
--Points on, inside, outside				112(8)		
--Euler's formula				113(1)		
Closed surface						
7. Recognize relations & properties						
Comparison of regions & subregions	(See I-A - 3)			117(2)		
Slides, flips, turns				95,100(10) 28(8)/DT8(3)		
Turns about a point				101(9) 29(3)		
Symmetry						
--Line symmetry				95-7,100-101, 109,123(10) 28(3)		
8. Recognize symbols						
m( ) (measure of)				107(8) 30,32(10)		
B. Metric Geometry						
1. Measure length						
Unit length	(See VII - 3)					
Estimate length						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
--Nearest centimeter				103-107(10)		
--Nearest inch						
--Nearest quarter inch				103(4)		
Perimeter of polygons				103,120,123 (5)		
2. Measure area						
Unit area				114(10)		
Area of regions						
--Triangular				114,116,120 (10) 32(3)/DT10,14 (2)		
--Rectangular				114-116,123(10) 32(3)/DT10(1)		
--Square				114-115(2) DT14(1)		
--Circular (estimate)				115(2)		
--Cylindrical (surface)						
--Parallelograms				116(2) 32(3)/DT14(1)		
3. Measure volume						
Unit volume	(See VII - 5)					
Volume of closed surfaces						
--Cube						
4. Recognize number planes						
Points on number planes						
--Location of points				118-120(10) 33(8)/DT10(3)		
--Coordinates of points				118-120,121 (10)		
Lines on number planes			66(1)			
--Interpreting				120(4)		
Polygons on number plane				120,123(8) 33(4)/DT10(8)		
IX. Logical Thinking						
1. Agree & disagree with simple statements						
2. State whether a quantified statement is true or false (all, some, none)	11,26(10)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
3. State whether an "if-then" statement is true or false	11,27(10)					
4. Translate "if-then" statements into "all" statements, and vice-versa						
5. Complete sentences using if-then form	11(10)					
6. Make deductions using the "exhaustion" method						
7. Express logical statements by						
Sets & subsets						159,162(10)
Venn diagrams						
8. Make true sentences						
X. Function & Graphs						
1. Complete a set of ordered pairs by identifying function rule						
Addition		34,35,40-1, 58(10) 11(10)	78(3) 23(2)			
Subtraction		34-5,40-1, 58(10) 11(4)	78(2) 23(1)			
Multiplication		11(1)	78(2) 23(3)			
Division			78(2) 23(2)			
2. Practice with number pair TV			78(3)			
3. Represent & interpret data on						
Bar graphs						
Double bar graphs						
Linear graphs				121(6)		
Circle graphs						
4. Recognize function with two variables		34-5,40-1, 58(10)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 28	29 - 60	61 - 92	93 - 124	125 - 156	157 - 188
5. Compare data						
XI. Probability & Statistics 1. Recognize basic concepts Probability --Zero --One Average Range Cross-product						
2. Determine probability of two mutually exclusive events					150-151(10) 40(10)/DT13(6)	
3. Represent data Bar graph Double bar graph Linear graph Circle graph (PIE)				121(6)		
4. Compare data						
XII. Number Theory 1. Recognize special sets of numbers Odd & even numbers Prime numbers Composite number	(See I-A - 2) (See I-A - 2)					187(1) 45/DT15(1)
2. Identify factors --Common factors --Prime factorization --Factor tree --Sieve of Eratosthenes						166-167,184(10) 44-5(10)/DT15(6) 170-171(10) 171(10) 168(1)
3. Identify multiples --Common multiples, multiples						160-164,187(10) 43(10)/DT15(4)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
4. Recognize number pattern --Pascal's Triangle						184(10) 188(1)
5. Represent a number as the power of a factor	(I-B - 1)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
I. Numbers and Numerals					
A. Numbers					
1. Recognize whole (cardinal) numbers to billions					
To 9					
To 99					
To hundreds		157(6)			317(4)
To thousands					
To billions					
2. Identify special concepts related to whole numbers					
Even and odd numbers	55(10)	246-7(6)			317,331(7) 88(2)
Prime numbers		247(5)			317,331(2) 88(1)
--As factors					
Composite numbers					
Square numbers					
Number pairs	207(8) 57(5)	228-9(10) 64(8)	280(6) 71(3)		/DT28(1)
Identity elements					
--Zero (addition)					
--One (multiplication)					
Abstract number system					
Clock arithmetic					326-9,331(1
Ordinal					319(3) 88(1)/DT26(2)
Nominal					319(3) 88(1)/DT26(2)
Cardinal					319(3) 88(1)/DT26(1)
3. Recognize fractional numbers					
Less than one			254(10) 70(2)		
Sets			254(10) 70(1)		
Greater than one					
Decimal fractions					320-3,331(10) 89(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
--Tenths					320-323,331(10) 89(10)
--Hundredths					322-323(10) 90(10)
B. Numerals					
1. Read & write whole numbers in different forms					
Compact form					
Expanded form					
Exponent form					
Roman numerals		DT21(7)			DT28(1)
Base 8					
2. Identify the value of a digit					
Face value					
Place value					
--To tens					
--To hundreds					
--To thousands					
--To millions					
--To billions					
Total value (concept)					
3. Recognize numerals for fractional numbers					
a/b					
Expanded					
Mixed			260-263,277, 283(10) 73,76,78(10) DT22(10)		93(6)
Decimal					320-323,331(10) 89(10)/DT26(6)
--To tenths					321-323(10) DT28(1)
--To hundredths			270-272,274- 275,283(10) 76(10)/DT22(6)		322-323(10) 90(10)/DT27(10)
Equivalent fractions					
--Simplest form			259,272(10)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
4. Regroup numbers through thousands					
C. Number-Numeral Distinction					
1. Identify more than one name for same number					
Equation					
Algorism					
2. Rewrite fractional numbers with specified denominators					
3. Recognize two forms of a number in a story problem					
D. Ordering					
1. Use <,=,> symbols to compare					
Whole numbers					
Fractional numbers			273(10)		
2. Use nearest, between to compare whole numbers		221(10)			
E. The Number Line					
1. Represent numbers					
Whole numbers					
Fractional numbers			256-257,260-263,270-273 (10) 93(8)		
2. Represent operations					
Addition					
Subtraction					
Multiplication					
Division	211(10)				
Inverse operations					
Rounding					
3. Represent properties					
Associativity					
Commutativity					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
4. Represent numbers on					
Vertical number lines					
Circular number line					
Number planes					
F. Concrete Models					
1. Use concrete models for whole numbers					
Abacus					
Sets					
Number rods					
Place value chart					
2. Recognize concrete models for					
Fractional numbers					
Sets and subsets					
Regions and subregions					
II. Mathematical Operations					
A. Properties					
1. Recognize properties of mathematical operations					
Associativity					
--Addition					329(2)
--Multiplication		225-227(10)			329(2)
Commutativity					
--Addition					329(3)
--Multiplication					329(2)
Common factor (distributive) property					
--Whole numbers			258,283(10) 72(7)		329(2)
--Fractional numbers			258(10) 72(10)/DT22(4)		
Nonassociativity					
--Subtraction					
--Division					
Noncommutativity					
--Subtraction					
--Division					
Inverse operations					
--Addition-subtraction					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
--Multiplication-division					
Identity elements					
--Zero in addition					
--One in multiplication					
Zero as a factor					
B. Development of Addition and Subtraction					
1. Identify related terms					
Addend					318(2)
Sum					318(3)
Difference (missing addend)					
Solution					
2. Recall basic facts					
Addition					
Subtraction					
Families of facts					
3. Recognize models for addition					
Union (joining two sets)					
Number rods					
Abacus					
4. Add whole numbers to billions					
Tens and ones					
--No renaming					
--Renaming	217(9)			299(6)	93(1)
Hundreds, tens and ones					
--No renaming					
--Renaming	217(9)	DT21(2)			93(1)
Numbers of unlimited size					
--No renaming					
--Renaming					
Three or more addends					
5. Recognize models for subtraction					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
Separation of subsets from sets					
Number rods					
Abacus					
6. Subtract with whole numbers to billions					
Tens and ones					
--No renaming					
--Renaming					
Hundreds, tens and ones					93(1)
--No renaming					
--Renaming	217(6)				
Numbers of unlimited size		DT21(3)			93(2)
--No renaming					
--Renaming					
7. Add & subtract numbers represented on					
12 - clock					326-327(10)
7 - clock					DT27(6) 328-329(10)
C. Development of Multiplication-Division with Whole Numbers					
1. Recognize related terms					
Factor					318(3)
Product					318(5)
Quotient (missing factor)	208,211-216,219(10) 58(10)/DT18(7)	230-237,248-249,251(10)	264,265(10)		318(1)
Remainder	210-216,219(10)	230-231,249,251(10)			
Missing digit	196(10)	63(4)			
2. Recall basic facts					
Multiplication	189(10) 50(7)	234(10)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
Division	189(10) 50(6)	234(10)			
Families of facts					
3. Recognize models for multiplication					
Addition of equal addends					
Pairing elements of two sets					
Joining sets of equivalent subsets					
4. Multiply whole numbers to four places					
Zero as a factor					
One as a factor					
Ten as a factor	197,201(10) 54(10)/DT17(6)				
One hundred as a factor					
Tens and ones					
--By 1-digit factor	190(10) 51(10)/DT17(6)	DT20(1)		299(5)	
--By 2-digit factor	198-204,217(10) 56(10)/DT17(6)	225-226,251(10) DT19,20(5)		299(6)	
Hundreds, tens & ones					
--By 1-digit factor	191-194,219(8) 52(10)/DT17(5)	222-223(10) 62(10)/DT19,20 (3)			
--By 2-digit factor		227(10) 63(10)/DT19(2)			
Thousands, hundreds, tens and ones					
--By 1-digit factor		229(10) 62(5)/DT19(3)			
5. Recognize models for division					
Subtraction of equal addends					
Separation of equivalent subsets from a set					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
6. Multiply numbers represented on					
12 - clock					326-327(10)
7 - clock					328-329(10)
7. Divide whole numbers to four places					
Tens and ones					
--1-digit divisor	214-215,219 (10) 59-60(7)/DT 18(4)	230-235(10) 65-6(10)			
--2-digit divisor					
Hundreds, tens and ones					
--1-digit divisor	215(10) 60(5)	235(10) 66-7(10)			
--2-digit divisor		248-249(10)			
Thousands, hundreds, tens, and ones					93(4)
--1-digit divisor					
--2-digit divisor					
D. Addition & Subtraction Algorisms					
1. Use horizontal form algorism					
Equation					
2. Use vertical form					
Expanded numerals					
Column diagrams					
Three-step form					
Four-step form					
Working (short) form					
Flow chart					
3. Estimate sums and differences					
4. Check addition and subtraction					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
E. Multiplication & Division Algorism					
1. Use horizontal (equation) form for multiplication		230(10) 65(3)			
2. Use vertical (working) form for multiplication*					
Factors less than 10					
Three-step method		63(10)			
Four-step method	192-194(10)				
Short (compact) form					
Common factor rule					
Flow chart	216(10)				
3. Use horizontal (equation) form for division	210-211,213(10) 59,65(10)/DT18, 19(10)	230-231(10)			
4. Use vertical (working) form for division					
Divisor and quotient less than 10					
Scaffold method (two-stage)	214,215,219 (10) 60(8)	232,234-237, 248-249,251 (10) 66-7(10)/DT 20,21 (9)			
Pyramid method					
Common factor rule					
5. Estimate products and quotients	200(10)	221,249(10) 61(10)			
6. Check division and multiplication	214-215(10)	233(10) 65(10)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 316	317 - 332
F. Operations with Fractional Numbers					
1. Recognize related terms					
Numerator			253(1) 70(4)		318(4)
Denomenator			253(1) 70(4)		
Decimal point					318(3) 320(10)
2. Rewrite fractions with specified denominators			272,277(10)		
3. Rename a fractional number					
a/b form					
Decimal form					
4. Add-subtract fractional numbers					
Less than one					
--Common denominators		DT21(3)	254-259,283 (10) 71(10)/DT22 (8)		320-322(10) DT28(2)
--Different denominators			274-275,283 (10) 77(10)/DT23 (10)		
Greater than one					
--No renaming			260-263,276-277(10) 73,78(10)/DT 23(5)		
--Renaming			277(6) 78(5)/DT23(5)		DT28(3)
Decimal fraction					
--To tenths					
--To hundredths					
5. Multiply fractional numbers					
A unit fraction by a whole number			253,264-265 (10) 70,74(10)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
A decimal fraction by a whole number					323(9) 91(10)
6. Interpret fractions as division			264-265(10) 70,74(8)		
G. Extensions					
1. State the function rule and complete a set of ordered pairs					
Addition			280(3)		
Subtraction			280(3)		
Multiplication					
Division					
2. Recognize alternate algorism					
Lattice method					
3. Construct flow charts					
III. Sets					
A. Recognition					
1. Recognize sets from description or roster					
Member of a set					317(10)
Brace notation					
2. Recognize relations between sets					
Subset		247(10)			
Equivalence					
Nonequivalence					
Equality					
3. Recognize special sets					
Empty sets					
Equal sets					
Finite sets					317(10) 88(1)
Infinite set					317(3) 88(1)
Set of equivalent subsets					
Set of ordered pairs		228-229(7)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 316	317 - 332
Sets of points					
4. State cardinal number property of set					
n( ) notation					
B. Operation					
1. Recognize related symbols					
Venn Diagrams		244-247(10)			
∪,∩					
2. Perform operations with sets					
Matching members					
--One to one					
--One to many					
Comparing sets			253-255,264 271(10)		
Joining sets					
Separating subsets from sets					
Cross multiplying two sets					
Intersection of two sets					
3. Relate set operations to operations on numbers					
Joining					
--Addition					
--Multiplication			253(8)		
Separating					
--Subtraction					
--Division	210-211(10) 59(8)		264(8)		
--Fractions			255(10)		
Cross multiplying					
--multiplication					
Intersection					
--Division					
--Subtraction					
4. Illustrate mathematical properties					
Associativity					
Commutativity					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
5. Use Venn Diagrams to represent					
Subsets		243-247(10)			
Intersections		243-247(10)			
IV. Problem Solving					
A. Mathematical Operations					
1. Solve verbal problems involving					
Addition and subtraction			281(8)	299(3)	
Multiplication & division	205(9)				
	53(9)	62,67(7)			
Two sets of sets					
Five-step method					
Rates - "per"	197(10) 57(1)		269(5) 75(10)		324-325
B. Mathematical Concepts					
1. Solve verbal problems related to					
Money	195(10)				
Time					
			77-8(3)		
Weight					
Speed, time, distance					
Social activities			266,281(10) 76-7(7)		
Linear measurement					320(3)
			78(2)		
V. Number Sentences					
A. Identify Open and Closed Sentences					
1. Decode symbols in number sentences					
<, >, =					
+, -					
x, ÷					
n (as a place holder)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 316	317 - 332
2. Read and/or write number sentences involving					
Fractions			266,273,281 (10)		
Exponents					
Money					
Metric system of measure					324-325,331 (10)
Logic statements					
Word problems					
Sets					
Number words					
3. Use <,>=,+,÷,x,-, or a numeral to make an open sentence true	217(10)		273(10)	299(10)	
4. Use ( ) to show mathematical properties					
Associativity					
Common factor rule					
Solve equations and inequalities		228-229(10)			
VI. Applications of Mathematics					
Apply mathematical concepts & skills to					
1. Science		238(8)		313(4)	
2. Social studies	195(10)		268(6) 78(10)		
3. Linear measurement					
4. Probability				306-312(10)	
5. Capacity			262-263,276- 277(4)		
6. Time					
VII. Measurement					
Recognize and use systems of measurement					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
1. Capacity					
Quart					324(2) 92(1)
Pint					324(3) 92(1)
Liter					324(5) 92(5)/DT27(1)
2. Money					
--Coins to dollars					
--Bills to $5.00,$15.00					
3. Length					
--Unit length					
--Inch				285(10)	324,325(7)
--Feet					
--Yard					324(4)
--Mile					324-325(10)
--Centimeter				285,287(10)	324-325(7) 92(6)
--Meter					324(4) 92(1)/DT27(1)
--Kilometer					324-325(10) DT27(1)
4. Area					
--Unit square				288-289,300 (10) 79(6)	DT28(1)
--Square inch				300(3)	
--Square mile					
5. Volume					
--Unit cube				300,302-303 (10) 84(10)/DT25 (3)	
--Cubic inch					
6. Weight					
--Pound					324(3)
--Kilogram					324(3)
7. Temperature					
--Fahrenheit degree					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
8. Time					
VIII. Geometry					
A. Nonmetric					
1. Identify basic concepts					
Points					
--Naming				81(1)	
Lines					
--Naming					93(1)
--End points					
--Parallel				286(3) 79(0)/DT24(1)	
--Perpendicular					
--Intersection				291(1) 81(1)	
Line segments					
--Naming				286(1) 79(0)/DT24 (1)	93(1)
--End points					
--Parallel					
--Perpendicular					
--Intersecting a plane				291(2) 70(1)	
Rays				291(10) 81(1)	93(1)
Angles					
--Intersection of two rays				286(2) 81(1)	
--Intersection of two planes					
--Right angles				286(2) 79(0)/DT24 (1)	
--Equal angles					
Planes					
--Parallel				290,315(1) 80-1(4)	DT28(1)

193

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
--Points in a plane				290-297(10)	
--Lines & line segments in a plane				290-291(10)	
--Intersecting				290-291(3) 80(6)	
2. Recognize geometric shapes					
Circle				287(2) 79(0)/DT24(1)	
--Center					
--Radius					DT28(1)
--Diameter					
Ellipse				298(4) 83(2)	
Triangle					
Square				83(1)	
Rectangle					
Parallelogram					
Rhombus					
Hexagon					
Polygon				287(2) 79[illegible]/DT24(1)	
Quadrilateral					
3. Recognize simple closed surface					
Cone				295(7) 83(3)	DT28(1)
--Base				315(1)	
--Height				295(1)	
Cylinder				296(10) 83(3)	DT28(1)
--Base				296(3)	
--Height				296(0)	
Sphere				297(10) 83(1)	
--Center				297(1)	
Cube				293-294,315-316(10)	DT28(1)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
--Edge				292-294,315 (2) 82(1)	
--Face				293(1) 82(1)/DT24(1)	
--Vertex				293-294,315 (10) 82(1)	
Pyramid				292,294(10) 82(4)/DT24(1)	
4. Construct geometric figure					
Line segment					
Circle (using a compass)					
Ellipse				298(1)	
Right angle (paper folding)					
5. Recognize regions					
Triangular					
Square					
Rectangular					
Circular					
6. Identify topological concepts					
Open curve					
Closed curve					93(1)
--Simple closed					
--Segment of					
--Vertex					
--Points on, inside, outside					
--Euler's formula					
Closed surface				292-297,301, 315(10)	
7. Recognize relations & properties					
Comparison of regions & subregions					
Slides, flips, turns					
Turns about a point					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
Symmetry					
--Line Symmetry					
8. Recognize symbols					
m( ) (measure of)				288(6)	
B. Metric Geometry					
1. Measure length					
Unit length					
Estimate length					
--Nearest centimeter				285(10)	
--Nearest inch				285(10)	
--Nearest quarter inch				287,289(9)	
Perimeter of polygons				79(6)/DT24(3)	DT28(1)
2. Measure area				288-289(10)	
Unit area				79(7)/DT24(3)	
Area of regions					
--Triangular				288(3)	
--Rectangular				288-289,300 (9)	DT28(1)
--Square					
--Circular (estimate)				296(1)	
--Cylindrical (surface)				288(2)	
--Parallelograms					
3. Measure volume					
Unit volume					
Volume of closed surfaces				300,302-303(10) 84(10)	
--Cube				300,302-303(3) 84(2)	
4. Recognize number planes					
Points on number planes					
--Location of points				304,305(10) 85(10)	DT25(6)
--Coordinates of points				304,305(10) 85(10)	
Lines on number planes				308-309,315 (10)	
--Interpreting					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 316	317 - 332
Polygons on number plane					
IX. Logical Thinking					
1. Agree & disagree with simple statements		240(10) 68(10)/DT20(3)			
2. State whether a quantified statement is true or false (all, some, none)		242-243(10) 69(10)/DT20(6)			
3. State whether an "if-then" statement is true or false		245-247(10)			317(4)
4. Translate "if-then" statements into "all" statements, and vice-versa		244-245(10)			
5. Complete sentences using if-then form					
6. Make deductions using the "exhaustion" method		246-247(10)			
7. Express logical statements by					
Sets & subsets		244-247(10)			
Venn diagrams		243-247(10)			
8. Make true sentences		240-241(10)			
X. Function & Graphs					
1. Complete a set of ordered pairs by identifying function rule					
Addition		228-229,251 (5) 64(7)/DT19(1)	280(3) 71(1)		
Subtraction		228-229(3) 64(1)/DT19(1)	280(3) 71(2)		
Multiplication	207(8) 57(3)	228-229(5) 64(5)/DT19(1)			
Division	57(2)	228-229,251 (5)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 316	317 - 332
2. Practice with number pair TV	207(4)	228(3)	280(6)	308(8)	
3. Represent & interpret data on					
Bar graphs				310(6) 87(5)/DT24(5)	
Double bar graphs				310(9)	
Linear graphs				309(6) 87(4)	
Circle graphs				312(10) 87(5)	
4. Recognize function with two variables		64(4)			
5. Comparing data				306-307(10) 86(10)	
XI. Probability & Statistics					
1. Recognize basic concepts					
Probability					
--Zero			278(1)		
--One			278(1)		
Average				306-308(9) 86(4)	
Range					
Cross-product					
2. Determine probability of two mutually exclusive events			278-279(10)		
3. Represent data					
Bar graph				310(5)	
Double bar graph				311(9)	
Linear graph					
Circle graph (PIE)				312(10)	
4. Compare data				306-307(10)	
XII. Number Theory					
1. Recognize special sets of numbers					
Odd & even numbers					88(2)/DT 26(1)

LMS MATH

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 4 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
Prime numbers Composite number					88(1)/DT26,28 (1)
2. Identify factors --Common factors --Prime factorization --Factor tree --Sieve of Eratosthenes		DT21(2)			DT28(1)
3. Identify multiples --Common multiples, multiples		DT21(2)			317(4) 88(2)/DT26,28 (1)
4. Recognize number pattern --Pascal's Triangle					
5. Represent a number as the power of a factor					DT28(1)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
I. Numbers and Numerals						
A. Numbers						
1. Recognize whole (cardinal) numbers	(See also all outcomes involving whole numbers)					
To thousands	5,24(0)					
To millions	16(6)					
To billions	17(0)					
2. Identify special concepts related to whole numbers						
Cardinal numbers	5,24(3)					
Ordinal numbers	24(3)					
Nominal numbers	24(4)					
Fractional numbers	(See II-F)					
Even and odd numbers						45-47(5)
12-clock & 7-clock numbers						178-179(6) 51(9)/DT16(3)
Prime numbers						
--Factors						166-167,169-171(10) 47(10)/DT15(5)
--Prime factorization						169-171(10) 48(10)/DT15(3)
Composite numbers						168-171(10) 48(10/DT15(3)
Number pairs						
--Ordered pairs		34-5(10)	68(3)			
--Coordinate pairs (graphing)				118-121(10)		
Factors,common factors						158-161 44-5(10)/DT15(5)
Greatest common factor						160-161(6) 45(6)/DT15(2)
Multiple, common multiple						162-164(10) 46(10/DT15(2)
Least common multiple						164(8) 46(6)/DT18(5) 199-200(10) 57(10)/DT18(5)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Identity elements	(See II-A)					
3. Recognize fractional numbers						
Fractional numbers	(See II-F)					
--Less than one						
--More than one						
Decimal fractions	(See also II-F - 6, 7, 8)					
--To tenths						
--To hundredths						
--To thousandths						
Percent	(See II-F - 2)					
B. Numerals						
1. Read and write whole numbers in different forms						
Compact form	5,12,13(10) 7(10)		DT7(3)			
Expanded form	12,13(10) 4(4)/DT1(3)		DT7(2)			
Exponential form	18,19,28(10) /DT2(5)		DT7(4)			171(10) 48(10)
2. Translate base 10 numerals to other bases						
Base 8	20(10) 8(10)/DT2(4)					
Base 2	28(10)					
3. Read and write numerals for fractional numbers						
a/b form					148-151(10)	
Mixed form					140-141(10) /DT12,14 (10)	
Expanded form						
Exponential form						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Decimal form						
Percent form	(See I-C - 2)					
Equivalent fractions	(See I-C - 2)					
4. Identify the value of a digit						
Face value	12(5)/DT1(1)					178,179(10)
Place value						
--tens	12,20,21(7) 4(1)					
--hundreds	12(6) 4(1)					
--thousands	12(3)/DT1(1) 4,6(6)					
--millions	12(1) 6(5)					
--billions	12(0) 6(2)					
Total value (concept)	12(6)/DT1(1)					
C. NUMBER-NUMERAL DISTINCTION						
1. Identify more than one name for same number						
Equation	(See II-B - 2, C - 2, G)					
Algorism	(See I-E,F)					
2. Write equivalent fractions						
With fractional numbers						
--specified denominator					135,148-151(10) 43(10)	
--percent						
--simplest form					39(10)	
With decimal fractions						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
D. Ordering 1. Use <,>,= symbols to compare numbers						
Whole numbers	14(3)					
Fractional numbers					129,131,151(10) 43(6)/DT13,14 (10)	
E. The Number Line 1. Represent numbers						
Whole numbers	14,15(2) 5(10)					
Fractional numbers					127,140,150, 151,192(10) 36(3)/DT12(3)	
2. Represent mathematical operations						
Rounding	15(10) 5(10)					
Addition-Subtraction						
--Whole numbers		35,36,42(10)				
--Fractional numbers					131(4) 37(3)	
Multiplication-division						
--Whole numbers						
--Fractional numbers					129(10) 36(2)	
3. Represent numbers on						
Circular number lines	(See I-A - 2)					
Number planes (graphs)				118-121(10)		
F. Concrete Models 1. Represent whole numbers by concrete models						
Abacus	13,16(4) 4(10)/DT2(2)			DT7(2)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Sets	(See III-A - 1,4)					
2. Represent fractional numbers by concrete models						
Sets and subsets					148(9)/DT11,13(5) 43(6)	
Regions and subregions					149(9)/DT11(2) 36(3)	
II. Mathematical Operations						
A. Properties						
1. Recognize properties of mathematical operations						
Associativity						
--Addition		31,32(6)/DT3(1)			134,135(4) 38(6)	
--Multiplication			66,74(2)/DT5(1) 21(1)			
Commutativity						
--Addition		31(5)/DT3(1)				
--Multiplication			66(1)/DT5(1) 21(1)			
Inverse operations						
--Multiplication-division with whole numbers			61-2,66,68(3) /DT5(1)			
--Multiplication-division with fractional numbers					DT11(6)	
--Addition-subtraction with whole numbers		31,39(3) 10(1)				
--Addition-subtraction with fractional numbers						
Common factor property (distributive)						
--Addition with whole numbers			66,71,75,76(10)			
--Addition with fractional numbers						
--Subtraction with whole numbers						
--Subtraction with fractional numbers						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
One Factor Property (identity)						
--Whole numbers			66(1) 21(1)			
--Fractional numbers						
Zero factor property			66(2)/DT5(1) 21(1)			
Zero addend property (identity)		31(2) 10(1)				
Modular numbers						178,179(4) 51(9)
2. Use concept of multiplying by one to rename						
Fractions					43(6)/DT13(4)	
Decimals						
Percent						
B. Development of Addition and Subtraction						
1. Identify related terms						
Addend		29,31,32(0)				
Sum		29,31,32(0) 10(1)				
Difference		29,31,32(0)				
Solution		29,31,32(0)				
2. Recall basic facts						
Addition-subtraction	2(5)	30(10) 11(6)				
Families of facts		30(10)				
3. Recognize models for addition						
Union of sets		29(1)				
4. Add whole numbers						
Numbers of unlimited digits		40-43,56(10) 13(10)/DT3(5)	DT7(4)			
Unlimited addends (more than two)		32,43(10)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
5. Recognize models for subtraction						
Separation of subsets from sets		29(1)				
6. Subtract with whole numbers-no limit on number of digits		33,44-46,56(10) 14(10)/DT3(5)	DT7(4)			
7. Add and subtract with denominate numbers		54,55(10) 17(6)/DT4(3)				
8. Add and subtract with numbers involving						
Money		52,53(10) 16(10)				
Systems of measurement		54,55(10) 17(10)				
C. Development of Multiplication-Division with Whole Numbers						
1. Recognize related terms						
Factor			62(0) 26(1)			158-161(10)
Product			62(0)			
Quotient			83(0) 26(1)			
Remainder			83(0) 26(1)			
2. Recall basic facts						
Multiplication-division	2(8)		61-63,67(10) 19(10)/DT6(4)			
Families facts			66-67(6)			
3. Recognize models for multiplication						
Addition of equal addends			61,62(10)/DT5(2)		37(6)/DT14(3)	179(8)

LMS MATH

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 28	29 - 60	61 - 92	93 - 124	125 - 156	157 - 188
Joining sets			61(10)		130,131(4)	
Pairing elements of two sets			61(10)/DT5(2)		131(3)	
4. Multiply whole numbers						
One as a factor			66(1)			
Zero as a factor			66(2)		129(1)	
Two-digit and 3-digit factors			71,72,74-77, 79(10)/DT5,6,7 22-24(10) (10)			180
5. Recognize models for division						
Separating sets			61,62(1)		132,133,146, 147(10)	
6. Divide whole numbers						
2,3-digit dividend with remainder						
--1-digit divisor with remainder			82-87(10)/DT7(2) 26(10)		143-145(10) 41(10)/DT13(3)	177(10)
--2-digit divisor with remainder						181-182(10) 52(8)
Multiply with denominate numbers						
More than 3-digit dividend with						
--2-digit divisor, with remainder						183-184(10) /DT16(3)
--1-digit divisor, with remainder					DT13(1)	177(7)
7. Multiply and divide with numbers involving						
Money			73,78,79,88(10) 22,24-25(10)			
D. Addition and Subtraction Algorisms						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
1. Use vertical form algorisms						
Expanded numerals		40-42,44-46(10)				
Long forms						
--3, 4, 5-place addition and subtraction		41(5)				
--n-place addition and subtraction						
Short forms						
--3, 4, 5-place addition and subtraction		40-43,44-46(10) 13,14(10)/DT3(6)	DT7(5)			
--n-place addition and subtraction			DT7(1)			
2. Check addition and subtraction		39,45,46(10) 12(4)				
3. Estimate sums and differences		39,45,46(10)				
E. Multiplication and Division Algorisms						
1. Use vertical form for multiplication			71,72,74(10)			
Expanded form			71,72,74(10)			
Long form for 3-digit numbers						
Short form for 3-digit numbers			72,74(10)/DT5,6(10) 22-24(10)			
Lattice method			92(10)			
2. Use vertical form for division						
Expanded form			86(10)			
Flow charts						
Standard form			83-87(10)/DT6(4) 26,27(10)		143-145(10) 41(10)/DT13(4)	181-184(10) /DT16(3)
3. Check multiplication and division			85,87(10)		143,145(4)	181,184(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
4. Estimate products and quotients			73,78,79(10) 25(10)/DT6(6)		142,143,145(10) 40(10)/DT12(3)	180-183(10) 51(9)
F. Operations with Fractional Numbers						
1. Recognize related terms						
Numerator					127(2) 36(1)	
Denominator - LCD					127(2) 36(1)	
2. Add-subtract with fractional numbers						
Less than one						
--No renaming					130,131(10) 37(3)	
--Renaming						
Greater than one						
--No renaming					140(8)	
--Renaming						
Percent						
3. Multiply fractional numbers						
A number less than one						
--By a whole number					128-135,141(10) 36,37(10)/DT11,12 (10)	
--By a unit fraction					147(6)/DT13(3) 42(9)	
--By a fractional number						
A number greater than one (mixed)						
--By a whole number					140,141(10)	
4. Divide by multiplying with reciprocal					DT11(6)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
5. Divide fractional number by whole number					147(6) 42(9)	
6. Add-subtract with decimal numbers						
Tenths						
Hundredths						
7. Multiply decimal numbers						
Tenths						
--By whole numbers						
Hundredths						
--By whole numbers						
--By tenths						
8. Divide decimal numbers by whole numbers						
Tenths						
Hundredths						
Thousandths						
G. Extension						
1. Complete number patterns						
Magic squares			60(5)			188(5)
Function rules		30,32				
--Addition-subtraction		34,35,45(10) 11(10)/DT3(2)				
--Multiplication-division			68(10) 21(10)		152(4)	173(10)
--Fractional numbers					135(3)	
2. Use distributive property in simplifying	(See II-A - 1)					
3. Recognize alternate algorism						
Lattice method of multiplication	(See II-E - 1)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Mental arithmetic	(See II-D - 3, E - 4)					
Flow charting		50-51(10)				
III. Sets						
A. Recognition						
1. Recognize sets from description or roster						
Members of a set	2,3(10)/DT1(3) 1(4)					
Brace notation						157(10)
2. Recognize relations between sets						
Subset	2,3(10) 1,3(9)		61(2)			
Equivalence	4(5)/DT1(1)					
Nonequivalence	4(0)					
Equality	4(1)					
3. Recognize special sets						
Empty set	1(3)					157(2)
Equal sets	4(1)/DT1(1) 1(3)					
Universal set	10,11(10) 3(6)					
Finite sets	4(2)/DT1(1) 1(2)					
Infinite sets	4(4)/DT1(1) 1(2)					
Disjoint sets						157(2)
Sets of equivalent sets	4(4)		61,82(10)			
Sets of number pairs	(See I-A - 2)					
--coordinates						
--ordered pairs						
Sets of points	(See VIII-B - 4)					
Sets of factors						159-161(7) 44,45(10)
Sets of multiples			82(10)			162-165,174-177(10) 46(1)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
4. State cardinal number property of sets						
n( ) notation	4(6)	10(4)	65(10)			
B. Operation						
1. Recognize related symbols						
Venn diagrams	1-3(10)					157,159,161, 163(10)
∪		29(0) 10(1)				
∩						157,159-161 (10)
⊆	2,3(0)					
⊗			64,65(10) 20(1)			
2. Perform operations						
Matching members of sets						
--One to one						
--One to many			69(10)			
--Many to many			64-65(10) 20(4)			
Comparison of sets		29(8)/DT3(1) 10(3)			125-128(10)	
Union of sets	26(0)	29(4) 10(1)	61(5)			
Separation of subsets from sets	26(3)	29(4) 10(1)				
Cross multiplication of sets			64,65(10) 20(4)/DT5(2)			
Intersection of sets						157,164(10)
3. Relate set operations to operations on numbers						
Joining						
--Addition		29,38(4) 10(1)/DT3(1)			130-131(10)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
--Multiplication			61(5) 19(3)			
Separating						
--Subtraction		29,38(4)/DT3 (1)				
--Division			61(5)		126-137(10)	
--Fractions					126-137(10) 37,38(9)/DT13 (3)	
Cross multiplying						
--Multiplication			64,65(10)			
Intersection						
--Division						
--Subtraction						
4. Illustrate mathematical properties						
Associativity of union						
Commutativity of union						
5. Use Venn Diagrams to represent						
Subsets	1-3(0)					159,161(0)
Intersections						157,164(0)
IV. Problem Solving						
A. Mathematical Operations						
1. Solve word problems involving						
Addition-subtraction						
--Whole numbers		38,47,57(10) 12,14,17,18(10)			139(2)	
--Fractional numbers						
Multiplication-division						
--Whole numbers			77(5) 27(5)		136,137,139(7)	185(2)
--Fractional numbers					136,137,139(7)	185(1)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Fractional numbers					136,139(5)	
Decimal numbers						
B. Mathematical concepts						
1. Solve word problems related to						
Logic						
Probability						
Money		52(7)/DT4(4)	78(3)			
Social activities						
Speed, time, distance						
Height						
Weight						185(3)
Measures		17(2)		34(2)	136-137,139 (10)	
Sharpshooting			70(10)	106(10)	138(10)	165(10)
Rates						
Temperature		57(10)				
Ratio	(See VIII-B - 6)					
Statistics						
--Range						
--Average	(See XI-1)					
--Median	(See XI-1)					
V. Number Sentences						
1. Decode symbols in number sentences						
>,<,=	14(3)				129,151(10)	
+,-	7(6)					
x, ÷						
≠						
n as a place holder	9,15,18,19 (10)					
2. Translate verbal expressions to						
Number phrases	6(7) /DT1(6)	(See also IV-A, B)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 28	29 - 60	61 - 92	93 - 124	125 - 156	157 - 188
Number sentences						
--Open sentences	8,9(3)					
--Closed false sentences	7-9(10)					
--Closed true sentences	7-9(10)					
3. Use <,>,=,+,÷,-,x to make an open sentence true	9(10) 2(10)				142,151(10)	180(6)
4. Use ( ) to show mathematical properties						
Associativity	(See also II-A - 1)					
Commutativity	(See also II-A - 1)					
5. Interpret number sentences related to						
Families of facts	(See II-B - 2, C - 2)					
Metric system of measures	(See VII - 1)					
Story problems	(See IV-A, B)					
Logic sentences (true-false)	(See IX-1, 2)					
Fractional numbers	(See IV-A)					
Exponents			70(2)			
Decimals						
Percents						
Two or more variables	(See VIII-A - 6, B - 2, B - 3)					
Money	(See IV-B - 1)					
Function rule	(See X-2, II-G - 1)					
Inequalities	(See V-3)					
Measurement	(See VII-1)					
VI. Applications of Mathematics						
1. Apply mathematical concepts of skills to						
Science						
--Temperature	57(10)					
--Meteors					153(5)	
--Gravity						185(6)
--Metal alloys						
--Atmosphere						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Social studies						
--Population	17(1)					
--Inventions			89(6)			
--Ships		47(8)				
--Pollution			81(3)			
--Bridges					138(8)	
--Automobiles						
--Bodies of water						
Public utilities						
The body						
Birds						
VII. Measurement						
1. Use standard units of measurement						
Capacity						
--Milliliters	23(4)					
--Liters	23(4)/DT2(1)					
--Cup						
--Half-pint		54(0)				
--Pint	21(5)	54(4)				
--Quart	21(4)/DT2(1)	54(4)				
--Gallon	21(9)/DT2(1)					
Time						
--Second		54(4)/DT4(1) 18(1)				
--Minute		54(4)/DT4(1) 18(2)				
--Hour		18(1)/DT4(1)				
--Day		/DT4(1)				
--Week		/DT4(1)				
--Year		/DT4(1)				
--Century						
Length						
--Inch	21(5)/DT2(1)	54(4)		94(6) 28(10)		
--Foot	21(10)/DT2(1)	54(4)				
--Yard	21(5)/DT2(1)					
--Mile		18(1)/DT4(1)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 28	29 - 60	61 - 92	93 - 124	125 - 156	157 - 188
--Centimeter	23(4)			94(6) 28(5)		
--Meter	23(4)/DT2(1) 9(2)					
--Kilometer	23(4)/DT2(1) 9(2)	18(1)				
Area						
--Square inch						
--Square foot						
--Square yard						
--Acre						
--Square mile						
--Square centimeter						
--Square meter						
--Hectare						
Volume						
--Cubic inch				34(2)		
--Cubic foot						
--Cubic yard						
--Cubic centimeter						
--Cubic meter						
Weight						
--Ounce	DT2(1)	54(4)/DT4(1)				
--Pound	DT2(1)	54(1)/DT4(1)				
--Grams	23(4)/DT2(1) 9(8)					
--Kilograms	23(4)/DT2(1) 9(1)					
--Ton		DT4(1)				
Temperature						
--Degree						
Angle						
--Unit angle				96(6) 29(3)		
--Degree				96-98(10) 29(6)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
2. Use standard measuring instruments						
Protractor						
--Measuring				96-98(9) 29(6)		
--Construction				96-98(10)		
Compass				100(8) 30(1)		
Ruler				94(10)		
3. Construct a protractor						
VIII. Geometry						
A. Nonmetric						
1. Identify basic concepts						
Points						
--Naming				102(2)		
Lines						
--Identification and naming				93(1) 28(1)		
--Parallel				103(3)/DT9(1)		
--Intersecting a plane				102(0)		
Line segment				93,94,103		
--Naming				93(3) 28(1)		
--End points				93(1)		
--Intersecting a plane				102(1)		
Rays				93,96(5) 28(1)		
Angles						
--Right				98(10)/DT8(1) 30(2)		
--Congruent					DT14(3)	
Planes				102(3)	DT14(1)	
--Intersecting				102,103(7)		
--Parallel				103(3)/DT9(1) 31(1)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Curves						
--Open				93(6)		
--Closed (simple)				100-101,104- 105(10)/DT9(1)		
2. Recognize geometric shapes						
Circles						
--Radius				100(8)/DT8(1) 30(2)		
--Diameter				100-101(3) 30(1)/DT8(2)		
--Center				100(1)/DT8(1) 30(1)		
--Semicircle				101(1)		
--Chord				30(1)		
--Circumference				100(1)/DT8(1)		
--Arc				101(4)		
Eclipse						
Triangles				31(1)		
--Right triangle						
--Hypotenuse						
--Pythagorean theorem				31(1)		
--Congruent						
--Similar						
Quadrilateral						
--Parallelogram				109(7) 32(1)		
--Rectangle				109(3) 32(1)		
--Square				109(2)/DT9(1) 32(1)		
--Diagonal				109(2)		
--Rhombus				109(2)/DT9(1) 32(1)		
Pentagon				108(1)/DT9(1) 31(1)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Hexagon				108(1)/DT9(1) 31(1)	DT14(1)	
Polygons						
--Perimeter						
--Vertex (angle)				104,109(4)		
--Side				109(1)		
Congruent figures						
Similar figures						
3. Recognize closed surfaces						
Rectangular solid						
--Face				113(7)/DT10(1) 31,33(3)		
--Edge				113(7)/DT10(1) 31,33(4)		
--Vertex				113(7)/DT10(1) 33(1)		
Pyramid				112,113(3)		
Cylinder				114(4)/DT10(1) 33(1)	DT14(1)	
Cone				114(4)/DT10(1) 33(1)		
Sphere				115(1)/DT10(1) 33(1)	DT14(1)	
--Center				115(2)		
--Diameter				115(2)		
Prism						
--Triangular				112-113(2)		
--Rectangular				112-113(2)		
Tetrahedron				112-113(0)		
4. Construct geometric figures						
Circles						
--Shapes in a circle				100(8) 30(1)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Angles						
--Oblique angles				97(7)		
--Right angle				96(1)		
--Right angle (paper folding)				98(1)		
Triangles				108(1)		
--Right triangle						
Quadrilateral				108(1)		
Square				32(1)		
Pentagon				108(1)		
Hexagon				108(1)		
Parallel lines				108(1)		
Parallelograms						
Eclipse						
Ray			28(1)			
Line segment			28(1)			
Line			28(1)			
Similar shapes						
Figures at a scale						
5. Recognize regions						
Triangular region						
Rectangular region						
Square region						
6. Identify topological concepts						
Inside				104-105(10) /DT9(1)		
Outside				104-105(0)		
Network						
--Euler's formula				104,113(2)		
7. Match geometric figures						
Congruent figures						
--Flips, slides, turns				95,99(10) 30(4)		
Symetrical figures						
Similar figures						
--Polygons						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
B. Metric						
1. Measure length						
Line segment				94(10)/DT8(3) 28(5)		
Perimeter of polygons						
2. Measure area of regions						
By counting unit area				DT9(1)		
--Triangular regions				111(8) 32(1)		
--Rectangular regions				110(3)/DT9(1) 32(1)	DT14(1)	
--Square regions				32(1)/DT9(1)		
Formulas						
--Triangles						
--Rectangles				32(5)		
--Squares						
--Surface area of cubes						
--Surface area of prisms						
3. Measure volume						
By counting unit volume						
--Cubes				117(2)/DT10(1)		
--General closed surface				117(6)/DT10(1) 34(6)		
--Rectangular prism				116(9)/DT10(1)	DT14(2)	
Formulas						
--Cubes						
--Rectangular prisms				34(1)		
4. Recognize number planes						
Points on number planes						
--Location of points				118-120(10) 35(10)		
--Coordinate points				118-120(10)		
Lines on number planes				120(2)		
Shapes on number planes				120(2)		
--Line symmetry						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
5. Measure angles						
By counting unit angle				96(6) 29(3)		
By using a protractor --Degree				96-98(10) 29(6)/DT8(4)		
6. Find the ratio of measures						
IX. Logical Thinking						
1. Agree or disagree with						
Simple statements						
Quantified statements						
--All, some, none						
"All or no" statements	2(4)					
"Some" statements						
2. Make simple deductions involving						
"If - then"	3(7)					
"If not - then"						
3. Recognize syllogistic deductions using						
Sets and subsets						
Venn diagrams						
4. Follow verbal directions and flow charts		48-51(10) 15(4)/DT4(5)				
X. Functions and Graphs						
1. Represent by a number sentence						
Function rules (meaning)	34-35(1)					
Probability function P(A)	(See XI-1)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Functions with two variables	(See VIII-B - 2)					
Functions with three variables (volume)	(See VIII-A - 6, B - 3)					
Number sequences		31(10) 12(5)				172(10) 50(4)
2. State function rule in a set of ordered number pairs		DT3(2)	21(4)			173(2)
3. Complete a set of ordered number pairs	(See II-G - 1)					
Multiplication and division						
Fractional numbers						
4. Picture functional data on number plane						
Linear graphs				120-121(2) /DT10(5)		
Bar graphs				35(1)		
Double bar graphs						
Table						
5. Interpret data						
Linear graphs				120-121(10)		
Bar graphs						
Double bar graphs						
XI. Probability and Statistics						
1. Recognize basic concepts						
Probability - chance (meaning)						
Probability function						
Average						
Median						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
2. Recognize the probability of an event (Applications of probability)						
Probability of zero						
Probability of one						
3. Relate probability to Sets and subsets						
Cross product combinations	(See III-B - 2)					
Graphs	(See X-4, 5)					
--Tables						
--Linear graphs						
--Bar graphs						
--Double bar graphs						
XLI. Number Theory						
1. Recognize concepts related to factors						
Prime numbers (property)	(See I-A - 2)					
Prime factorization (fundamental theorem of arithmetic)	(See I-A - 2)					
Goldbach conjecture						166(0)
Greatest common factor	(See I-A - 2)					
Least common multiple	(See I-A - 2)					
2. Recognize number patterns involving						
Addition-subtraction of whole numbers	(See II-G - 1)					
Multiplication-division of whole numbers	(See II-G - 1)					
Fractional numbers	(See II-G - 1)					
Sequences	(See X-1)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Magic squares	(See II-G - 1)					
Modulo 12	(See I-A - 2)					
Modulo 7	(See I-A - 2)					
Function rule	(See II-G)					
3. Identify divisibility tests for						
2						175(3)/DT16(4)
3						174(3)/DT16 49(10) (3)
4						175(3)/DT16 49(10) (1)
5						176(1)/DT16 50(10) (3)
6						176(1)/DT16 50(10) (3)
9						177(7) 50(9)
10						176(1)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 316	317 - 332
I. Numbers and Numerals					
A. Numbers					
1. Recognize whole (cardinal) numbers	(See also all outcomes involving whole numbers)				
To thousands					
To millions					
To billions					
2. Identify special concepts related to whole numbers					
Cardinal numbers					
Ordinal numbers					
Nominal numbers					
Fractional numbers					
Even and odd numbers					
12-clock and 7-clock numbers					
Prime numbers					
--Factors	57(2)				
--Prime factorization					
Composite numbers					
Number pairs					
--Ordered pairs	202(10)			295,312,313 (10)	
--Coordinate pairs (graphing)				294-295(10)	
Factors, common factors					
Greatest common factor					
Multiples, common multiples					
Least common multiple	199-200(10) 57(10)/DT18(5)				
Identity elements	(See II-A - 1)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
3. Recognize fractional numbers					
Fractional numbers	(See II-F)				
--Less than one					
--More than one					
Decimal fractions	(See also II-F - 6, 7, 8)				
--To tenths			274-275(10)		318-320(10) 88-90(7) /DT26(1)
--To hundredths			276-277(10)		318-320(10) 88-90(10) /DT26(1)
--To thousandths					319-320(10) 88-90(10) /DT26(1)
Percent	(See II-F - 2)				
B. Numerals					
1. Read and write whole numbers in different forms					
Compact form					317(2) 87(10)
Expanded form					
Exponential form					317(4)/DT26(4) 87(10)
2. Translate base 10 numerals to other bases					
Base 8					
Base 2					
3. Read and write numerals for fractional numbers					
a/b form			DT23(5)		DT26(4)
Mixed form	192-3,208-13(10) 54(10)/DT17(5)	DT21(4)			
Expanded form	192-3,208-13(10) 54(10)		277(10)		320(10) 89(6)
Exponential form					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
Decimal form			274-81(10) 76(10)/DT23(5)		317-27(10) 88-89(10)/DT26 (4)
Percent form	(See I-C - 2)				
Equivalent fractions	(See I-C - 2)				
4. Identify the value of a digit					
Face value					
Place value					
--Tens					317(2)/DT26(1)
--Hundreds					317(1)/DT26(1)
--Thousands					317(2)/DT26(1)
--Millions					317(1)
--Billions					
Total value (concept)					
C. Number-Numeral Distinction					
1. Identify more than one name for same number					
Equation	(See II-B - 2, C - 2, G)				
Algorism	(See I-E, F)				
2. Write equivalent fractions					
With fractional numbers	192,194(10)				
--Specified denominator	196-199,208-213 55(8)		260,274,276-77 (10) /DT23(5)		
--Percent					329-332(10) 93,94(10) /DT27,28(5)
--Simplest form	195-200,208-213 (10) /DT17(5) 55(8)	DT21(4)			
With decimal fractions			276-277(10) 76(10)/DT23(5)		317-327(10) 88,89(10) /DT26,27, 28(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
D. Ordering					
1. Use <,>,= symbols to compare numbers					
Whole numbers					
Fractional numbers					
E. The Number Line					
1. Represent numbers					
Whole numbers					
Fractional numbers					
2. Represent mathematical operations					
Rounding					
Addition-subtraction					
--Whole numbers	192(0)				
--Fractional numbers					
Multiplication-division					
--Whole numbers					
--Fractional numbers			253,255(5)		
a. Represent numbers on					
Circular number lines	(See I-A - 2)				
Number planes (graphs)				294,295(10)	
F. Concrete Models					
1. Represent whole numbers by concrete models					
Abacus					
Sets	(See III-A - 1, 4)				
2. Represent fractional numbers by concrete models					
Sets and subsets					
Regions and subregions			76(3)/DT22(3)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 316	317 - 332
II. Mathematical Operations					
A. Properties					
1. Recognize properties of mathematical operations					
Associativity					
--Addition					
--Multiplication			254,258,261, 264(10)/DT22(6) 71(6)		
Commutativity					
--Addition					
--Multiplication			261(4)		
Inverse operations					
--Multiplication-division with whole numbers					
--Multiplication-division with fractional numbers			270-272(10) 75(10)/DT23(8)		DT28(4)
--Addition-subtraction with whole numbers					
--Addition-subtraction with fractional numbers					
Common factor property (distributive)					
--Addition with whole numbers	191,195(6)				
--Addition with fractional numbers	191,195(0)		284(10)		
--Subtraction with whole numbers	191,195(6)				
--Subtraction with fractional numbers	191,195(0)				
One factor property (identity)					
--Whole numbers					
--Fractional numbers					
Zero factor property					
Zero addend property (identity)					
Modular numbers					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
2. Use concept of multiplying by one to rename					
Fractions	55(3)				331-332(10)
Decimals					331-332(10)
Percent					331-332(10)
B. Development of Addition and Subtraction					
1. Identify related terms Addend Sum Difference Solution					
2. Recall basic facts Addition-subtraction Families of facts					
3. Recognize models for addition Union of sets					
4. Add whole numbers Numbers of unlimited digits Unlimited addends (more than two)					
5. Recognize models for subtraction Separation of subsets from sets					
6. Subtract with whole numbers-no limit on number of digits					
7. Add and subtract with denominate numbers					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
8. Add and subtract with numbers involving Money Systems of measurement					
C. Development of Multiplication-Division with Whole Numbers 1. Recognize related terms Factor Product Quotient Remainder					
2. Recall basic facts Multiplication-Division Families facts					
3. Recognize models for multiplication Addition of equal addends Joining sets Pairing elements of two sets	DT17(3)		71(4) 253(3)		91(3)
4. Multiply whole numbers One as a factor Zero as a factor Two-digit and three-digit factors					
5. Recognize models for division Separating sets					
6. Divide whole numbers 2,3-digit dividend with remainder --1-digit divisor with remainder		231(10)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
--2-digit divisor with remainder					
Multiply with denominate numbers					
More than 3-digit dividend with					
--2-digit divisor with remainder					
--1-digit divisor with remainder		232-233(10) 66(8)/DT20(4)			
7. Multiply and divide with numbers involving					
Money					
D. Addition and Subtraction Algorisms					
1. Use vertical form algorisms					
Expanded numerals					321,322
Long forms					
--3,4,5-place addition and subtraction					
--n-place addition and subtraction					
Short forms					
--3,4,5-place addition and subtraction					
--n-place addition and subtraction					
2. Check addition and subtraction					
3. Estimate sums and differences					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
E. Multiplication and Division Algorisms					
1. Use vertical form for multiplication					
Expanded form			280(9)		
Long form for 3-digit numbers			280(10)		
Short form for 3-digit numbers			280(10)		
Lattice method					
2. Use vertical form for division					
Expanded form		66(10)			
Flow charts		231,232(0)			
Standard form		231-233(10) 66(8)/DT20(4)			327(10)
3. Check multiplication and division					
4. Estimate products and quotients					
F. Operations with Fractional Numbers					
1. Recognize related terms					
Numerator					
Denominator - LCD	196-201(10) 57(10)/DT18(3)				
2. Add-subtract with fractional numbers					
Less than one					
--No renaming	192,193(10) 53(9)				
--Renaming	195-202(10) 55,56(10)/DT17(5)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 316	317 - 332
Greater than one	195-202(10) 55,56(10)/DT17 (5)				
--No renaming	190-193,208-09, 212,213,217-220 (10)/DT18(5) 59,60(10)	DT21(2)			
--renaming	217-220(10) 59,60(10) /DT18(5)	DT21(3)			
Percent					329-331(10)
3. Multiply fractional numbers					
A number less than one					
--By a whole number	191(10)		253-255,284 (10)/DT22(4) 71(10)		
--By a unit fraction			256-261(10) 72(7)/DT22(2)		
--By a fractional number			262-265(10) 74(8)/DT22(6)		
A number greater than one (mixed)					
--By a whole number			255(0)		
4. Divide by multiplying with reciprocal		78(8)	270-272(10) 75(10)/DT23(8)		DT28(4)
5. Divide fractional number by whole number					
6. Add-subtract with decimal numbers					
Tenths			275(10)/DT23(2) 77(2)		321(10)/DT27(6) 90(5)
Hundredths			278(10)/DT23(4) 77(10)		322(10)/DT27,28 (5) 90(5)
7. Multiply decimal numbers					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 31o	11 317 - 332
Tenths					
--By whole numbers			279,280(10) 78(7)		323,324(10) 91(6)/DT27(1)
--By tenths			279(6) 78(3)		324(8) 91(5)
Hundredths					
--By whole numbers			279,280(10) 78(9)/DT23(4)		323,324(10) 91(10)/DT27,28 (4)
--By tenths					324(10)/DT27(1)
8. Divide decimal numbers by whole numbers					
Tenths					326(3) 92(5)
Hundredths					326(10) 92(10)/DT27(2)
Thousandths					327(10)/DT27,28 (3) 92(2)
G. Extension					
1. Complete number patterns					
Magic squares	61(1)				
Function rules					
--Addition-subtraction	202(10)	222,223(10) 63(4)			
--Multiplication-division		222,223(10) 63(6)			
--Fractional numbers	202(10)		254,258-259(9)		
2. Use distributive property in simplifying	(See II-A - 1)				
3. Recognize alternate algorism					
Lattice method of multiplication	(See II-E - 1)				
Mental arithmetic	(See II-D - 3, E - 4)				
Flow charting		230-32(5)		288-91,307, 316(10)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
III. Sets					
A. Recognition					
1. Recognize sets from description or roster					
Members of a set					
Brace notation					
2. Recognize relations between sets					
Subset					
Equivalence					
Nonequivalence					
Equality					
3. Recognize special sets					
Empty set					
Equal sets		245(2)			
Universal set					
Finite sets					
Infinite sets					
Disjoint sets		238,239,241-243(0)			
Sets of equivalent sets					
Sets of number pairs	(See I-A - 2)				
--Coordinates					
--Ordered pairs					
Sets of points	(See VIII-B - 4)				
Sets of factors					
Sets of multiples	199,200(10)				
4. State cardinal number property of sets					
B. Operation					
1. Recognize related symbols					
Venn diagrams		240,244(8)			
$\cup$					
$\cap$					
$\underline{\in}$		245(5)			
$\underline{\otimes}$					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
2. Perform operations					
Matching members of sets					
--One to one				296(10)	
--One to many		224,225(10)			
--Many to many					
Comparison of sets		244-245(10)		296(10)	
Union of sets		240,241(0)			
Separation of subsets from sets					
Cross multiplication of sets					
Intersection of sets		240-249(0)			
3. Relate set operations to operations on numbers					
Joining					
--Addition	206(10)/DT71(3)				
--Multiplication			253(2)		
Separating					
--Subtraction	190(6)				
--Division					
--Fractions	190(6)		253,256,257, 259,262,263 (10)/DT22(3) 72,73(10)		DT28(3)
Cross multiplying					
--Multiplication					
Intersection					
--Division					
--Subtraction					
4. Illustrate mathematical properties					
Associativity of union					
Commutativity of union					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
5. Use Venn diagrams to represent					
Subsets		240,244(0)			
Intersections		240,244(0)			
IV. Problem Solving					
A. Mathematical Operations					
1. Solve word problems involving					
Addition-subtraction					
--Whole numbers		237(4) 62(2)			
--Fractional numbers	201,211,214 (10) 56,59(5)				
Multiplication-division					
--Whole numbers		235(8) 62(1)	269(1)	300(3)	
--Fractional numbers	214(4)		267(7) 74(2)		
Fractional numbers	201,211,214(10)		267,269,273(10)	300(3)	
Decimal numbers					328(10)
B. Mathematical Concepts					
1. Solve word problems related to					
Logic		240-49(10)			
Probability	204-207(10)				
Money		62(1)			
Social activities					
Speed, time, distance		64(10)			
Height					
Weight				300(6)	
Measures		62(1)			
Sharpshooting	202(10)	234(10)	268(10)	302(10)	
Rates		224-25(10) 64(6)/DT19(5)			
Temperature					
Ratio	(See VIII-B - 6)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 316	317 - 332
Statistics					
--Range					
--Average	(See XI-1)				
--Median	(See XI-1)				
V. Number Sentences					
1. Decode symbols in number sentences					
>,<,=					
+,-					
x,÷					
≠		239(2)			
n as a place holder		221(10)/DT19(6) 62(10)			
2. Translate verbal expressions to					
Number phrases	(See also IV-A, B)				
Number sentences					
--Open sentences					
--Closed false sentences					
--Closed true sentences					
3. Use <,>,=,+,÷,-,x to make an open sentence true	216(10)	239(10)			
4. Use ( ) to show mathematical properties					
Associativity	(See also II-A - 1)		258(0)		
Commutativity	(See also II-A - 1)				
5. Interpret number sentences related to					
Families of facts	(See II-B - 2, C - 2)				
Metric system of measures	(See VII-1)				
Story problems	(See IV-A, B)				
Logic sentences (true-false)	(See IX-1, 2)				
Fractional numbers	(See IV-A)				
Exponents					
Decimals			281(7)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
Percents					330(2)
Two or more variables	(See VIII-A - 6, B - 2, B - 3)				
Money	(See IV-B - 1)				
Function rule	(See X-2, II-G - 1)				
Inequalities	(See V - 3)				
Measurement	(See VII - 1)				
VI. Applications of Mathematics					
1. Apply mathematical concepts and skills to					
Science					
--Temperature					
--Meteors					
--Gravity					
--Metal alloys			273(5)		
--Atmosphere					
--Social studies				300(6)	
--Population					
--Inventions					
--Ships					
--Pollution					
--Bridges					
--Automobiles	215(4)				
--Bodies of water		237(6)			
Public utilities		235(8)			
The body			269(3)		
Birds	216(4)				
VII. Measurement					
1. Use standard units of measurement					
Capacity					
--Milliliters					
--Liters					
--Cup				83(2)	
--Half-pint					
--Pint				83(1)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
--Quart				83(1)	
--Gallon					
Time					
--Second					
--Minute					
--Hour					
--Day					
--Week					
--Year					
--Century					
Length					
--Inch					
--Foot					
--Yard					
--Mile					
--Centimeter				286,296,298(4)	
--Meter					
--Kilometer					
Area					
Square inch				304(3)	
--Square foot				304(1)	
--Square yard				304(1)	
--Acre				300(0)	
--Square mile				304(1)	
--Square centimeter					
--Square meter					
--Hectare					
Volume					
--Cubic inch				304,311(6)	
--Cubic foot				84(3)	
--Cubic yard					
--Cubic centimeter					
--Cubic meter					
Weight					
--Ounce					
--Pound					
--Grams					
--Kilograms					
--Ton					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 316	317 - 332
Temperature					
--Degree					
Angle					
--Unit angle					
--Degree				286(4)	
2. Use standard measuring instruments					
Protractor					
--Measuring				306(1)	
--Construction				307(3)	
Compass					
Ruler				286(4)	
3. Construct a protractor					
VIII. Geometry					
A. Nonmetric					
1. Identify basic concepts					
Points					
--Naming					
Lines					
--Identification and naming					
--Parallel				290(3) 79(1)	
--Intersecting a plane					
Line segment					
--Naming				286,287,290(10)	
--End points					
--Intersecting a plane					
Rays					
Angles					
--Right				285,306,307(7) 79(1)	DT28(1)
--Congruent				298(0) 81(3)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

	CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
	Planes					
	--Intersecting					
	--Parallel					
	Curves					
	--Open					
	--Closed (simple)					
2.	Recognize geometric shapes					
	Circles					
	--Radius					
	--Diameter				288(2) 79(1)	
	--Center					
	--Semicircle					
	--Chord					
	--Circumference					
	--Arc					
	Eclipse				301(3)	
	Triangles					
	--Right triangle				306,307(5)	
	--Hypotenuse				306(1)	
	--Pythagorean theorem				291(4) 80(5)	
	--Congruent				287(3)	
	--Similar				297(4)	
	Quadrilateral					
	--Parallelogram				291(4) 80(5)	
	--Rectangle					
	--Square				285,289(2)	
	--Diagonal					
	--Rhombus					
	Pentagon					
	Hexagon				288(1)	
	Polygons					
	--Perimeter				305(4)	
	--Vertex (angle)				295(1)	
	--Side					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

	CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
	Congruent figures					DT24(4)
	Similar figures					DT24(3)
3.	Recognize closed surfaces					
	Rectangular solid					
	--Face					
	--Edge					
	--Vertex					
	Pyramid					
	Cylinder					
	Cone					
	Sphere					
	--Center					
	--Diameter					
	Prism					
	--Triangular					
	--Rectangular				308-311(10)	
	Tetrahedron					
4.	Construct geometric figures					
	Circles					
	--Shapes in a circle					
	Angles					
	--Oblique angles					
	--Right angle				306-307(10)	
	--Right angle (paper folding)					
	Triangles				289(10)	
	--Right triangle				306-307(10)	
	Quadrilateral				291(3)	
	Square				289-91(6)	
	Pentagon				289-91	
	Hexagon				288(1)	
	Parallel lines				290(4)	
	Parallelograms					
	Eclipse				301(1)	
	Ray					
	Line segment					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

	CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
	Line					
	Similar shapes					
	Figures at a scale				299(9) 81(1)	
5.	Recognize regions					
	Triangular region				304,305,309, 311(10)	
	Rectangular region				310,311(3)	
	Square region				304,305,308, 311(5)	
6.	Identify topological concepts					
	Inside					
	Outside					
	Network					
	--Euler's formula					
7.	Match geometric figures					
	Congruent figures					
	--Flips, slides, turns				292-295(10) 79(2)	
	Symetrical figures				292-95(10)/DT24(3) 80(4)	
	Similar figures				297(7) 81(3)	
	--Polygons				298(6)	
B.	Metric					
1.	Measure length					
	Line segment				286(4)	
	Perimeter of polygons				305(2)/DT25(3) 82(4)	
2.	Measure area of regions					
	By counting unit area					
	--Triangular regions					
	--Rectangular regions				DT25(3)	DT28(1)
	--Square regions					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

	CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
	Formulas					
	--Triangles				305,310-311(7) 82(3)/DT25(1)	
	--Rectangles				305,310-311(4) 82(3)/DT25(1)	
	--Squares				304,310-311(5) 82(2)	
	--Surface area of cubes				309(8) 83(2)	
	--Surface area of prisms				309(1)/DT25(3) 83(4)	
3.	Measure volume					
	By counting unit volume					
	--Cubes				83(2)	
	--General closed surface					
	--Rectangular prism				304(10)/DT25(3) 83(1)	
	Formulas					
	--Cubes				304,308-311(10)	
	--Rectangular prisms				304,308-311(10) 83,84(8)/DT25(4)	DT28(2)
4.	Recognize number planes					
	Points on number planes					
	--Location of points					
	--Coordinate points					
	Lines on number planes					
	Shapes on number planes					
	--Line symmetry				293-295(10) 80(3)/DT24(3)	
5.	Measure angles					
	By counting unit angle					
	By using a protractor					
	--Degree				286(3)/DT24(4) 79(6)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
6. Find the ratio of measures				296-298(10) 81(4)	
IX. Logical Thinking					
1. Agree or disagree with Simple statements		238-39(10) 67(10)/DT20(4)			
Quantified statements --All, some, none		241(10) 68(6)			
"All or no" statements		240-43(10) 68(10)/DT20(5)			
"Some" statements		240-43(10) 68(6)/DT20(1)			
2. Make simple deductions involving "If - then"		246-47(10) 69,70(10)/DT20 (4)			
"If not - then"		248-49(10)			
3. Recognize syllogistic deductions using Sets and subsets		238,240-49(10) 69(2)			
Venn diagrams		238,240-49(10) 68-70(8)			
4. Follow verbal directions and flow charts		230-232(5) 70(5)		289-91,307 315(10)	
X. Functions and Graphs					
1. Represent by a number sentence					
Function rules (meaning)					
Probability function P(A)	(See XI-1)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 284	10 285 - 316	11 317 - 332
Functions with two variables	(See VIII-B - 2)				
Functions with three variables	(See VIII-A - 6, B - 3)				
Number sequences					
4. Picture functional data on number plane					
Linear graphs					
Bar graphs				312(3) 85(1)	
Double bar graphs				313(1)	
Table				312-313(3)	
5. Interpret data					
Linear graphs					
Bar graphs				312(10) 85(5)/DT25(3)	
Double bar graphs				313(10)	
XI. Probability and Statistics					
1. Recognize basic concepts					
Probability-chance (meaning)	204(1)				
Probability function	205(2)				
Average		226-229,252(10) 65(5)/DT19(3)			
Median		227,229(10) 65(2)			
2. Recognize the probability of an event (applications of probability)	204-207(10) 58(10)/DT18(9)				
Probability of zero	58(2)				
Probability of one	58(1)				
3. Relate probability to Sets and subsets	204,206(2) 58(10)/DT18(3)				
Cross product combination	(See III-B - 2)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 5 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 284	285 - 316	317 - 332
Graphs --Tables --Linear graphs --Bar graphs --Double bar graphs	(See X-4, 5)				
XII. Number theory					
1. Recognize concepts related to factors					
Prime numbers (property)	(See I-A - 2)				
Prime factorization (fundamental theorem of arithmetic)	(See I-A - 2)				
Goldbach conjecture					
Greatest common factor	(See I-A - 2)				
Least common multiple	(See I-A - 2)				
2. Recognize number patterns involving					
Addition-subtraction of whole numbers	(See II-G - 1)				
Multiplication-division of whole numbers	(See II-G - 1)				
Fractional numbers	(See II-G - 1)				
Sequences	(See X-1)				
Magic squares	(See II-G - 1)				
Modulo 12	(See I-A - 2)				
Modulo 7	(See I-A - 2)				
Function rule	(See II-G)				
3. Identify divisibility tests for					
2					
3		DT21(3)			
4		DT21(1)			
5		DT21(1)			
6					
9		DT21(1)			
10					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6

CHAPTER	1	2	3	4	5	6
PAGES	1 - 26	27 - 60	61 - 92	93 - 124	125 - 156	157 - 188
I. Numbers and Numerals						
A. Numbers						
1. Identify different kinds of numbers						
Cardinal (whole) numbers	24(10)					
Ordinal numbers	24(10)					
Nominal numbers	24(10)					163(1)
Perfect numbers						
Prime numbers	(See XII - 1)					
--Prime factorization	(See XII - 1)					
Fractional numbers	(See I-A - 3)					
Rational numbers						
Irrational numbers						
Integers						
--Negative numbers						
Odd and even numbers						
2. Recognize special concepts related to numbers						
Number pairs						
--Ordered pairs (functions)	(See X - 1)					
--Coordinate pairs (graphing)	(See X - 1)					
Identify elements						
--One (multiplication)	(See II - 1)					
--Zero (addition)	(See II - 1)					
Factors						
--Common factors	(See XII - 1)					
--Greatest common factor	(See XII - 1)					
Multiples						
--Common multiples	(See XII - 1)					
--Least common multiple	(See XII - 1)					
--Of 10,000	(See XII - 1)					
--Of 2,3,4,5,6,8,9	(See XII - 1)					
--Powers of 10	(See XII - 1)					
--Squaring	(See XII - 1)		69(10) 22(10)/DT5(5)			
Clock arithmetic						
--7 clock numbers	(See II-B - 3)					
--12 clock numbers	(See II-B - 3)					

HOUGHTON MIFFLIN INSTRUCTION OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
3. Recognize fractional numbers						
Fractional numbers in common form						
--Less than one						125(10) 36(10)/DT11(3)
--Greater than one						126-127(10) 37(10)/DT11(5)
Fractional numbers in decimal form						
--To tenths					142-143(10) 41(6)/DT13(1)	
--To hundredths					143(10) 41(6)/DT13(1)	
--To thousandths					144-145(10) 41(6)/DT13(1)	
Percent	(See I-C - 2)					
B. Numerals						
1. Read & write numerals for whole numbers						
Compact form	12-15(10) 6(4)/DT2(2)					
Expanded form	12-15(10) 6(2)	36(10)				
Exponential form	13-5(10) 6(10)/DT2(3)					
--Standard form						
2. Read & write numerals for fractional numbers						
Expanded form						
--Common fractions(a/b)					126-127(10) 37(4)	
--Decimal fractions					144-145(10)	
Mixed form						
--Common fractions					126-127(10) 37(10)/DT11(10)	
--Decimal fractions					142(10) 41(6)/DT13(1)	
Percent form	(See I-C - 2)					

HOUGHTON MIFFLIN INSTRUCTION OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 28	2 29 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
3. Recognize systems of numeration						
Base 10 (Decimal)	12,22-3(10)					
Base 8	22-3(10)					
Base 2						176,177,178,179(10) 51(6)/DT16(6)
Roman numerals	25(10) 9(10)/DT2(4)					
Early Arabic numerals						
4. Identify the value of a digit						
Face value	12(10)					
Place value	12,23(10) DT2(3)	29(0)				
Total value	12,(10)					
C. The Number - Numeral Distinction						
1. Identify two names for the same number						
Equation		29-31(10) 10-11(10)/DT3(4)				
Algorism		32,36,42-3 48-53(10) 11(10)/DT3-4(10)				
2. Identify more than one name for fractions						
A fractional number in common form (a/b) --As a mixed fraction (vice versa)					126-127(10) 37(10)/DT11(5)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
--As a fractional number in common form (a/b)					130-131,139(10) 38(10)/DT12(6)	
--Specified denominator					130(10) 40(10)/DT11(4)	
--Simplest form						
--As a decimal (vice versa)					143,144,145(10) DT13(10)	
--Repeated decimal						
--As a percent (vice versa)					146-147(10) 42-3(10)/DT12(5)	
--As a ratio (vice versa)					153-153(10)	
A decimal number as a percent(vice versa)					146(10) 42(8)/DT13(5)	
D. Ordering						
1. Use relational symbols: <, >, =	11,16(10)	56(10)				
2. Order numbers						
Whole numbers	16(10)					
Fractional numbers						
Integers						
E. The Number Line						
1. Represent numbers						
Fractional numbers					125-126,129-130, 132,133,134,135, 142(10) 36,38(10)	
Rational numbers						
2. Represent mathematical operations						
Addition-subtraction						
--Integers						
--Fractional numbers						
Multiplication-division						
--Integers						
--Fractional numbers					132,133,134,135 129(10)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Multiplication-division						
--Integers						
--Fractional numbers					132,133,134, 135, 129(10)	
Factoring						164(6)
Rounding	16-7(10) 7(10)/DT2(4)		66(10) 21(10)/DT5(3)			
Graphing solution sets for equations and inequalities						
Renaming numbers		32,36(10)			131(6) 39(4)	
3. Use number planes to determine						
Distance between two points	(See VII-B - 1)					
Coordinates of a point	(See X - 1)					
A function rule	(See X - 5)					
Movement of a shape	(See VII-A - 1)					
F. Concrete Models						
1. Represent whole numbers by concrete models						
Abacus	14(0)					
Sets	2-3(10) 1(10)					
2. Represent fractional numbers by concrete models						
Sets and subsets					125(2) 39(2)	190(8)
Regions and subregions					125(2) 36-8,42(10)	

HOUGHTON MIFF[illegible] INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 13 - 124	5 125 - 156	6 157 - 188
II. Mathematical Operations						
A. Properties						
1. Recognize properties of mathematical operations						
Associativity						
--Addition		29-30(10) 10,13(6)/DT3(1)				
--Multiplication		40-1(6) 13(4)/DT4(1)				
Commutativity						
--Addition		29(0) 10,12(6)/DT3(1)				
--Multiplication		40(0) 16(6)/DT4(1)				
Common Factor Property (Distributive)						
--Multiplication		40-1(10) 13-4(9)/DT4(1)				
--Division		48,50(2) 16(4)				
Inverse operations						
--Addition-subtraction		34(6) 12(3)/DT3(4)				
--Multiplication-division		48(10) 16(6)/DT4(2)				
--Squaring-square root		88(10) 27(4)				
Zero-Factor Property						
--Multiplication		40(0)				
Zero-Product Property						
--Division		48(0)				
Zero-Addend Property						
--Addition		29,34(1) DT/3(1)				
Closure Property						
One-Factor Property						
--Multiplication		40(0)				
Modular number system	(See XII - 1)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 26	27 - 60	61 - 92	13 - 124	125 - 156	157 - 188
2. Use property concepts to perform mathematical operations						
One-factor Property to rename						
--Fractions is percent form					147(10)	
--Fractions in common form					137(10) 39-40(10)/DT12(6)	
Zero-Addend Property to rename decimals						
Inverse Property to solve equations		34,48(10)	88(6)			
B. Development of Addition-Subtraction with Whole Numbers						
1. Identify related terms						
Addends		29(10)				
Sum		29,30,33(10) 10-1(10)				
--Of factors of a number	(See XII - 1)					
--Of two primes	(See XII - 1)					
Difference		34(10)				
Solution	11(10) 5(7)					
2. Recall basic facts						
Addition		29(10) 10(10)/DT3(4)				
Subtraction		34(10) 12(10)/DT3(4)				
Families of facts		34(6) 12(4)/DT3(4)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
3. Add whole numbers						
Two 5-digit numerals		32(10) 11(10)/DT3(5)				
Base-8 numerals	22-3(10) 9(6)					
Base-2 numerals						179,177(10) 51(1)
12-clock numerals						180-181,184(10) 52(7)/DT16(1)
7-clock numerals						182, 183,184(10) 52(7)/DT16(1)
Denominate numerals						
4. Subtract with whole numbers						
Two 5-digit numerals		34-9(10) 12(5)/DT3(5)				
Base 2 numerals						179,177(5) 51(6)
12-clock numerals						180-181,184(10) DT16(1)
7-clock numerals						182,183,183(10) DT16(1)
C. Development of Multiplication-Division With Whole Numbers						
1. Recognize related terms						
Factor		40-1(0)				
Product		42-3(10) 14(10)/DT4(5)				
Quotient		48,(10) 17(10)/DT4(4)				
Remainder		48,(10) 17(8)/DT4(4)				
Division					129(0)	
Dividend					129(0)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

	CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
2.	Recall basic facts						
	Multiplication		40(10) 13(6)/DT4(2)				
	Families of facts		48(3) 16(10)/DT4(2)				
3.	Multiply whole numbers						
	Base-2 numerals						177,178,179(5)
	12-clock numerals						180,184(10) 52(3)/DT16(1)
	7-clock numerals						183,184(10) 52(7)/DT16(1)
	1-digit and 3,4,-digit factors			62(10) 19(10)/DT5(2)			
	1-digit and 6-digit factors			62(8)			
	2-digit and 3-digit factors			63,61(10) 19(3)/DT5(3)			
4.	Divide whole numbers						
	2,3-digit dividend						
	--1-digit divisor		48-3,(10) 17(10)/DT4(4)	70(3) DT5(2)			
	--2-digit divisor			80-1(10) 25(2)/DT6(2)			
	4,5-digit dividend						
	--1-digit divisor			70-1(10) 23(8)/DT5(2)			
	--2-digit divisor			82-5(10) 24-5(10)/DT6(2)			
	Square roots			88(10) 27(8)/DT6(5)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
5. Estimate products and quotients	(See III-E - 3)					
D. Addition-Subtraction Algorisms						
1. Use algorisms for n-place addition-subtraction						
Long form						
--Expanded form		36(10)				
--3-step form		36(8)				
--4-step form		32(6)				
--Number pattern		32(10)				
Short form		32,36(10) 11(10)/DT3(5)				
2. Check addition-subtraction		39(10)				175(10)
E. Multiplication-Division Algorisms						
1. Use algorisms for multiplication						
Horizontal form						
--Equation		41,43(10) 14(2)/DT4(2)				
--Standard form	(See I-B - 1)					
Vertical forms						
--Expanded		41(2) 14(4)/DT				
--3-step		42-3(10)				
--Lattice		14(10)/DT4(5) 61(8)				
Flow charting	(See III-H - 2)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
2. Use algorisms for division						
Horizontal form						
--Equation		49-50(10) 16(4)/DT4(2)				
--Standard form	(See I-B - 1)					
Vertical forms						
--Scaffold (long form)		50-2(10)				
--Pyramid		50-2(10)				
--Short (working form)		48 (10) 17(10)/DT4(4)				
3. Estimate quotients, products and square roots			67,79-80, 82-3 21,25(10)/DT5-6(7)			
4. Check multiplication-division		52(10)				
F. Operations With Fractional Numbers						
1. Recognize related terms						
Numerator					125(10) DT11(1)	
Denominator					125(10) DT11(1)	
2. Add fractional numbers in common form						
Addends less than one						
--Sum less than one						
--Sum greater than one						
Addends greater than one						
--One addend greater than one						
--Two addends greater than one						

HOUCHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
3. Subtract with fractional numbers in common form						
Fractional numbers less than one						
The given addend less than one						
Fractional numbers greater than one						
4. Multiply fractional numbers in common form						
A fractional number less than one						
--By a whole number					128,129,131 138,(10) 38(10)/DT11(2)	
--By a number less than one					132,133,134,135, 136,137(10) 39(10)/DT12(8)	
A mixed fractional number						
--By a whole number						
--By a mixed fractional number						
5. Add-subtract with fractional numbers in decimal form						
1-place decimal numbers						
2-place decimal numbers						
3-place decimal numbers						
6. Divide with fractional numbers in common form						
A fractional number						
--With a whole number						
--With a fractional number (reciprocal)						
A whole number with a fractional number						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
7. Multiply fractional numbers in decimal form 1,2,3-place decimal numbers less than one by --Whole numbers --Multiples of 10 --1-place decimal number less than one 1,2,3-place mixed decimal numbers by --Whole numbers --1-place mixed decimal number						
8. Divide with fractional numbers in decimal form 1,2,3-place mixed decimal numbers with --Whole numbers without remainder --Whole numbers with remainder --1,2,3-place decimal numbers without remainder 1,2,3-place decimal numbers less than one with 1,2,3-place decimal numbers less than one						
9. Add-subtract fractional numbers in percent form						
10. Calculate percentages Specified percents of numbers Percent one number is of another						149-50(10) 43(6)/DT13(4) 151(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
11. Relate fractional numbers in percent form to						
Fractional numbers in common form	(See I-C - 2)					
Fractional numbers in decimal form	(See I-C - 2)					
12. Perform operations with rational numbers						
Addition						
Multiplication						
G. Operations with Integers						
1. Perform operations with integers						
Addition						
Subtraction						
H. Extensions						
1. Complete number patterns						
Magic squares	(See XII - 2)					
Linear functions	(See X - 4)					
2. Recognize alternate algorisms						
Mental arithmetic						
Flow charting				104(3) 34(1)		158(1)
Lattice method of multiplication	(See II-E - 1)					
Checking by "casting out nines"						175(10)
3. Find the square root of a number by prime factorization						162(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
III. Sets						
A. Recognition						
1. Recognize sets from description or roster						
Members of a set	1(8) 1(5)/DT1(1)					
Diagrams	1,2-7(10) 1-3(10)/DT1 (3)					
--Brace notation	1-6(10) 1-3(10)/DT1 (9)					
2. Recognize relations between two sets						
Subset (⊂ notation)	2-3(10) 1,4(10)/DT1 (2)					
Equivalence	3(1)					
Nonequivalence	3(1)					
Equality	3(1)					
3. Recognize special sets						
Empty set	2-3(7)					
Equal sets	3(1)					
Finite sets	1(8) 1(3)/DT1(1)					
Infinite sets	1(8) 1-2(4)/DT1 (1)					
Sets of equal subsets					128,130,133 (10)	
Universal set	8(10) 4-5(10)					
Solution set						
Sets of number pairs						
--Ordered pairs	(See X - 1)					
--Coordinate of points	(See X - 1)					
Sets of points	(See X - 1)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
4. State cardinal number property of sets n ( ) notation						
B. Operations 1. Recognize related symbols						
∪ (union)	5(10) 2(4)/DT1(1)					
∩ (intersection)	4(10) 2(2)/DT1(2)					
2. Perform operations Matching members of sets --One to one --One to many						
Union	5(10) 2(4)/DT1(1)					
Intersection	4(10) 2(3)/DT1(2)					
Replacement	11(10) 5(7)/DT1(3)					
3. Illustrate properties of union Associativity Commutativity						
4. Recognize Venn Diagrams representing						
Subsets	(See III-A - 1)					
Union	5(4)					
Intersection	4-5(4) 2(3)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
IV. Problem Solving						
1. Solve word problems involving						
Problem solving methods						
--Five-step method		33(5)				
Mathematical operations						
--Addition-subtraction		33,37(10) 11(1)				
--Multiplication-division		43(3)	63,76-7,84, 86-7(10)		132(2)	
Different sets of numbers						
--Whole numbers		33,37,43(10) 17(2)	63,78,84, 86-7(10)			
--Fractional numbers					132,152(10) 43(6)	
--Decimals and percent					150-1(5)	
--Negative integers						
Different content domains						
--Logic	6-8(10) 3(10)/DT1 (3)					
--Measurement						
--Money	(See VI - 1)					
--Probability						
--Rates		47(10)	64-5(10) 20(10)			
--Statistics			72-78(10) 24(9)/DT6 (9)			
--Social activities		33(5)				
--Speed, time, distance	(See VI - 1)					
--Ecology		37(7)				
--Astronomy		56(8)				
--Sports		33(1)				
--Gravity	(See VI - 1)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 26	27 - 60	61 - 92	93 - 124	125 - 156	157 - 188
V. Number Sentences						
1. Decode symbols in number sentences						
>, <,	11(10) 5(7)/DT1(2)					
+, -	8-9,11(10)					
x, ÷	8-9,11(10)/ DT1(1)					
=, ≠	11(10)	34,44(10)				
n and m as place holders	11(6)			94,96-9(10) DT9(6)		
2. Identify number sentences						
Number phrases	9(10) 5(8)/DT1(3)					
Equations						
--Open	10-11(10)					
--Closed	10-11(10)					
--True	10-11(10) 5(5)					
--False	10-11(10)					
Inequalities	11,16(10) 5(7)/DT1(2)					
3. Use >, <, = to make an open sentence true	11(10) 5(8)					
4. Use ( ) to show mathematical properties						
Associativity		30,41(0) 10(3)/DT3-4 (2)				
Commutativity		29,40(0)				
Order in subtracting		34(0)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 26	27 - 60	61 - 92	93 - 124	125 - 156	157 - 188
5. Recognize number sentences involving						
Equivalent sentences						
Graphing	(See X - 4)					
Sets of solution						
Functions	(See X - 5)					
Families of facts	(See II-B - 2 and II-C - 2)					
Story problems						
Logic sentences	(See IX - 1,2,3,4,5)					
Exponents	(See I-B - 1)					
Square roots	(See II-A - 1)					
Decimals	(See II-F - 5,7,8)					
Percents	(See II-F - 9)					
Two or more variables	(See X - 2)					
VI. Application of Mathematics						
1. Apply mathematical concepts and skills to						
Science						
--Outer space		56(8)				
--Gravity						185(5)
--Moon				121(8)		
--Body	19(4)					
--Temperature						
--Earth's surface						
Business and money		33,43(6)	86,87(10)			
School and everyday life						
--Population	18(10)					
--Time						185(5)
--Pollution		37(7)				
Transportation and Communication						
--Vehicles						
--Motor fuel						
--Distance, mile		33(1)				185(5)

HOUGTHON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 26	27 - 60	61 - 92	93 - 124	125 - 156	157 - 188
Construction and measurement						
--Design						
--Scale drawing						
--Using formulas						
VII. Measurement						
1. Use standard units of measurement						
Capacity						
--Pints	20(5) 8(1)	46(8)				
--Quarts	20(5) (8(2)					
--Gallon		46(8) 18(2)				
--Peck						
Time						
Money			86(10) 26(4)			
Weight						
--Ounce	20(5) 8(2)/DT2(1)	46(8)				
--Pound	20(5) 8(2)/DT2(1)	46(8)		28(1)		
--Gram	21(10) 8(3)/DT2(1)					
--Kilogram	21(5) 8(2)/DT2(1)			28(1)		
Temperature						
--Degree						
Length						
--Inch	20(5) 8(4)/DT2(1)			94(10) 28(1)		
--Foot	20(10) 8(3)/DT2(1)	46(8)		94(6)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
--Yard	20(5) 8(2)	46(8)		94(6) 28(1)		
--Mile				94(6) 28(1)		
--Centimeter	20(10) 8(2)/DT2(1)			94(10) 28(1)		
--Meter	20(5) 8(2)			94(6) 28(1)		
--Kilometer				94(6) 28(1)		
Area						
--Unit area				108-9(10) 32(4)		
--Square inch				108-9,119-20 (10)		
--Square foot				108-9(1)		
--Square yard						
--Acre						
--Square mile						
--Square centimeter				109,119(5)		
--Square meter				109(1)		
--Hectare						
--Square kilometer						
Volume						
--Unit cube				118(8)		
--Cubic inch				119(2)		
--Cubic foot				120(3)		
--Cubic yard						
--Cubic centimeter				119(2)		
--Cubic meter						
Angle						
--Degree				96(10) 28(3)/DT8(4)		
2. Use standard measuring instruments						
Compass				102-4(10)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Ruler				102-4(10) 31(3)		
Protractor (construction)				96(10) 31(1)/DT8(4)		
VIII. Geometry						
A. Nonmetric						
1. Identify basic concepts						
Points						
--Location (number plane)						
--Naming						
Lines				97(6)		
--Determining				28(1)/DT8(1)		
--Parallel				97(3) 29(1)		
--Perpendicular				97(3) 29,31(2)		
--Intersecting						
Line segments				94,97(4) 28(1)/DT8(1)		
--Congruent				94(1) 31(3)		
--Bisector						
--Perpendicular				97(3) 29(1)		
--Perpendicular bisector						
Rays				93(1) 28(1)/DT8(1)		
Angles				96-7(10) 28-9(5)/DT8 (1)		
--Right				97(0)		
--Congruent				96(2) 29(1)		
--Bisector						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
--Of triangles				99(3)		
--Of polygons						
--Vertical (opposite)						
--Number plane						
--Points on				111(10) 33(10)/DT9(3)		
--Lines on						
--Shapes on						
--Intersection				112(8)/DT10 (3)		
--Parallel				112(6)		
Curves						
--Simple closed curve				113(4)		
--Open curve				113(4)		
2. Recognize geometric shapes						
Triangles				99(10) 28(1)/DT8(1)		
--Right				99,110(9) 29,33(2)/DT8(1)		
--Isosceles				99(6) 33(1)/DT8(1)		
--Equilateral				99(8) 29(1)/DT8(1)		
--Congruent				104(10) 29,31(4)		
--Similar						
Circle						
--Radius				102,117(6)/DT9(1)		
--Chord				102(4)/DT9 (1)		
--Diameter				102,117(8) 31(1)/DT9(1)		

LMS MATH

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
--Center				102,117(1)/DT9 (1)		
--Circumference				102(1) 31(1)		
--Arc				103(4)		
--Semicircle				103(2) 31(1)		
Ellipse				104(3)		
Parallelogram				98,109(10) 29(1)		
Rectangle				109(10) 29(1)		
Square				109(10) 29(2)		
Rhombus				98(10) 29(1)		
Pentagon				95(4) 28(1)		
Hexagon				95(4) 28(1)/DT8(1)		
Octagon				95(3) 28(1)/DT8(1)		
Quadrilateral				95(4) 28(1)/DT8(1)		
--Similar						
Polygon				95(9) 31(2)		
--Perimeter				95(4)/DT8(4)		
--Diagonal				95(5)		
--Regular						
3. Recognize closed surfaces						
Cube				114(3) 34(1)/DT10(1)		
--Edge				114(5) 34(10)		
--Face				114(5) 34(6)/DT10(4)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 26	27 - 60	61 - 92	93 - 124	125 - 156	157 - 188
--Vertex				114(5)/DT10(4)		
Cylinder				116(4)		
--Base				116(1)		
--Rounded surface				116(0)		
Prism				114,118-120(2) 34(2)/DT10(1)		
Pyramid				115(2) 34(1)/DT10(2)		
Sphere				117(10)		
--Radius				117(2)		
--Diameter				117(2)		
--Center				117(1)		
--Great circle				117(2)		
Cone				116(4)		
4. Construct geometric figures						
Lines						
--Parallel lines						
--Perpendicular lines						
--Congruent lines				105(0) 31(2)		
--Perpendicular bisector of a line						
--Compass and ruler						
--Paper folding						
Angles						
--Congruent angles				96(0)		
--Bisector of an angle						
--Ruler and compass						
--Paper folding						
Triangles						
--Congruent triangles				105(0)		
Squares				32(3)		
Rectangles						
Ellipses				104(1)		
Regular hexagons				104(1)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

	CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
	Similar polygons				104(0)		
	Quadrilaterals						
5.	Recognize regions						
	Rectangular				108-9(10)		
					32(3)/DT9(1)		
	Triangular				108-9(6)/DT9(1)		
	Square				108-9(4)		
					32(1)		
	Parallelogram				108-9(5)/DT9(1)		
	Circular						
	Irregular				108(2)		
5.	Identify topological concepts						
	Closed curves						
	--On, outside, inside				113(4)		
	Closed surfaces						
	--Vertex, edge, face				114-5(10)		
					34(10)/DT10(8)		
	Network, Euler's formula						
	Covering the plane						
7.	Match geometric figures						
	Congruence of segments and shapes						
	--Slides, flips, turns				100-1(10)		
					30(10)		
	Line symmetry of shapes				100-1(0)/DT9 (4)		
	Similar figures						
B.	Metric						
1.	Measure length						
	Curves						
	Distance between two points				111(10)		
	on number plane				33(1)/DT9(6)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 26	27 - 60	61 - 92	93 - 124	125 - 156	157 - 188
Distance of a point to a line (Pythagorean Theorem)				111(9) 33(6)/DT9(2)		
Line segments						
--By ratio and scale						
Perimeter of polygons				95(4)/DT8(4)		
Circumference (C = 2 π r)						
2. Determine area of regions						
By unit count						
--Parallelogram				108(2)/DT9(1)		
--Rectangle				108(2) 32(3)/DT9(1)		
--Square				108(2) 32(7)		
--Triangle				108(2)/DT9(1)		
--Irregular regions (estimate)				108(2)		
By formula						
--Parallelogram				109(2)		
--Rectangle				109(6)		
--Square				109(2)		
--Triangle				109(3)		
--Surface of space figures				119-120(10) 35(6)/DT10(2)		
--Circular regions (πr^2)						
3. Determine volume of space figures						
By unit count						
--Cube				118(2)		
--Rectangular prism				118(2) 35(10)/DT10(2)		
--Irregular				118(4)		
By formula						
--Cube						
--Rectangular prism						
--Cylinder ($h\pi r^2$)						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
4. Determine angles						
Sum of angles on same side of a straight line				31(1)		
Sum of angles formed by two intersecting lines						
Sum of angles in a triangle						
Sum of angles in a polygon						
IX. Logical Thinking						
1. Use set diagrams (Venn Diagrams) to make a statement						
"All-some" - statements	6-7(4) 3(5)					
"If-then" - statements	6-7(8) 3(5)/DT1(3)					
2. Use set diagrams to determine whether a statement is true or false						
"If-then" - statement	6-7(4) 3(1)					
"If not - then" - statement	6-7(9) 3(1)					
3. Make statements to relate to set diagrams						
"No - or some" - statements						
"All - or some" - statements						
4. Make statements to disagree with						
"No - or some" - statements						
"All" - statements						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER	1	2	3	4	5	6
PAGES	1 - 26	27 - 60	61 - 92	93 - 124	125 - 156	157 - 188
5. Make deductions						
Using a universal and specific premise						
--If all, if one - then						
By the method of elimination						
--If not - then						
X. Functions and Graphs						
1. Recognize number pairs						
Ordered pairs		31,38,43,50(10) 18(3)/DT4(1)				
Coordinates of points				111(0) 33(6)		
2. Define function as a mapping of one set into another set						
3. Recognize f(m) notation						
4. Use the number plane to represent linear functions						
x, f(x) axes						
Graphs						
--On number line						
--On number plane				111(10)		
Bar graphs			72(4) 24(3)	33(10)		
Double bar graph			72(2)			
Tables						
5. Translate functional data to number sentences						
Function rules		54(10) 18(6)/DT4(1)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
Rates		45-6(10) 15(9)/DT4(5)	64-5(10) 20(10)/DT5(3)			
Sequences		55(10) 17(3)				
XI. Probability and Statistics						
1. Recognize basic concepts						
Probability (meaning)						
Average			72-78(10) 24(3)/DT6(3)			
Range			73(5)			
Mode			76-78(10) 24(3)/DT6(3)			
Median			75-78(10) 24(3)/DT6(3)			
2. Relate probability to						
Sets and subsets						
Cross product combination						
Collecting and comparing data	(See IX - 1)					
Using data	(See IX - 1)					
Graphing data	(See X - 4)					
--Tables	(See X - 4)					
--Bar graphs	(See X - 4)					
--Double bar graphs	(See X - 4)					
3. Recognize probability values						
Zero						
One						
4. Determine the probability of events						
Two mutually exclusive events						
Independent events						

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
XII. Number Theory						
1. Recognize special sets of numbers						
Factors						157-8(10) 44,47(10)/DT15(4)
--Common factors						164(10) 47(2)/DT15(3)
--Greatest common factor						165,170(10) 47(2)/DT15(1)
--Prime numbers						158-9(10) 45(10)/DT15(10)
--Properties						159(10) 45(10)
--Prime factorization						160-1(10) 46(10)/DT15(6)
--Goldbach conjecture						159(10) 45(10)
Multiples						166(10) 48(8)/DT15(3)
--Common multiples						166-7(10) 48(4)
--Of 10, 100	13(0)					172-4 49(1)
--Of 2, 3, 4, 5, 6, 8, 9						172-5(10) 49-50(10)/DT16(6)
--Powers of 10	13,14(10) 6(10)/DT2(3)					
--Least common multiple						168,170(10) 48(3)/DT15(1)
Perfect numbers						163(2)
Modulo 7 numerals						180-1,184(10) 52(10)/DT16(3)
Modulo 12 numerals						182-3,184(10) 52(10)/DT16(3)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	1 1 - 26	2 27 - 60	3 61 - 92	4 93 - 124	5 125 - 156	6 157 - 188
2. Recognize patterns of numbers and operations						
Magic squares		38(10)				
Checking by eliminating nines	(See II-H - 2)					
Divisibility rules	(See XII - 1)					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
I. Numbers and Numerals					
A. Numbers					
1. Identify different kinds of numbers					
Cardinal (whole) numbers					
Ordinal numbers					
Nominal numbers					
Perfect Numbers					
Prime numbers					
--Prime factorization					
Fractional numbers					
Rational numbers					330-331(10) DT27(7)
Irrational numbers					331-(1)
Integers					325-326(10) 91(10)/DT27(4)
--Negative numbers					326-327(10) 91(10)/DT27(4)
Odd and even numbers					317(2) 87(3)/DT26(2)
2. Recognize special concepts related to					
Number pairs					
--Ordered pairs (functions)					
--Coordinate pairs (graphing)					
Identify elements					
--One (multiplication)					
--Zero (addition)					
Factors					
--Common factors					
--Greatest common factor					
Multiples					
--Common multiples					
--Least common multiple					
--Of 10,000					
--Of 2,3,4,5,6,8,9					
--Powers of 10					
--Squaring					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
Clock Arithmetic					
--7 clock numbers					
--12 clock numbers					
3. Recognize fractional numbers					
Fractional numbers in common form					
--Less than one	190(10)				
--Greater than one	189(10) 54(8)				
Fractional numbers in decimal form					
--To tenths					
--To hundredths					
--To thousandths					
Percent					
Numerals					
1. Read and write numerals for whole numbers					
Compact form					
Expanded form					
Exponential form					
--Standard form			288(10)		
2. Read and write numerals for fractional numbers					
Expanded form					
--Common fractions (a/b)					
--Decimal fractions					
Mixed form					
--Common fractions					
--Decimal fractions					
3. Recognize systems of numeration					
Base 10 (Decimal)					
Base 8					
Base 2					
Roman numerals					
Early arabic numerals					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
4. Identify the value of a digit					
Face value					
Place value					
Total value					
C. The Number-Numeral Distinction					
1. Identify two names for the same number					
Equation					
Algorithm					
2. Identify more than one name for fractions					
A fractional number in common form (a/b)					
--As a mixed fraction (vice versa)	192(10) 54-5(10)		72(10)/DT22(3)		
--As a fractional number in common form (vice versa)					
--Specified denominator	189(10) 53(9)				
--Simplest form			283(10) 72(8)/DT22(3) 285(10)		
--As a decimal (vice versa)	61(7)				
Repeated decimal					
--As a percent (vice versa)	61(7)				
--As a ratio (vice versa)				302(10) 83(10)/DT25(2)	
A decimal number as a percent (vice versa)	61(7)/DT18(4)				
D. Ordering					
1. Use relational symbol: <, >, =			282(10)		
2. Order numbers					
Whole numbers					
Fractional numbers			282(10)		
Integers					326(10)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
E. The Number Line					
1. Represent numbers					
Fractional numbers					
Rational numbers					330(10) DT27(7)
2. Represent mathematical operations					
Addition-subtraction					
--Integers					327(10) 92(4)
--Fractional numbers	190,192(2) 53(10)				
Multiplication-division					
--Integers					
--Fractional numbers					
Factoring					
Rounding					
Graphing solution sets for equations and inequalities		224-5(10) 63(10)			
Renaming numbers					
3. Use number planes to determine					
Distance between two points					
Coordinates of a point					
A function rule					
Movement of a shape					
F. Concrete Models					
1. Represent whole numbers by concrete models					
Abacus					
Sets					
2. Represent fractional numbers by concrete models					
Sets and subsets	190(8)				
Regions and subregions					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
II. Mathematical Operations					
A. Properties					
1. Recognize properties of mathematical operations					
Associativity					
--Addition					
--Multiplication					
Commutativity					
--Addition					
--Multiplication					
Common Factor Property (Distributive)					
--Multiplication					
--Division					
Inverse operations					
--Addition-subtraction					
--Multiplication-division					
--Squaring-square root					
Zero-Factor Property					
--Multiplication					
Zero-Product Property					
--Division					
Zero-Addend Property					
--Addition					
Closure Property					324-331(10)
One-Factor Property					
--Multiplication					
Modular number system					
2. Use property concepts to perform mathematical operations					
One-Factor Property to rename					
--Fractions in present form					
--Fractions in common form	189(10) 53(9)/DT17(3)		258-9(10)		
Zero-Addend Property to rename decimals			282(10)		
Inverse Property to solve equations					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
B. Development of Addition-Subtraction with whole numbers 1. Identify related terms Addends Sum --Of factors of a number --Of two primes Solution					
2. Recall basic facts Addition Subtraction Families of facts					
3. Add whole numbers Two 5-digit numerals Base-8 numerals Base-2 numerals 12-clock numerals 7-clock numerals Denominate numerals					
4. Subtract with whole numbers Two 5-digit numerals Base-2 numerals 12-clock numerals 7-clock numerals					
C. Development of Multiplication-Division with whole numbers 1. Recognize related terms Factor Product Quotient Remainder Divisor Dividend					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
2. Recall basic facts Multiplication Families of facts					
3. Multiply whole numbers Base-2 numerals 12-clock numerals 7-clock numerals 1-digit and 3,4-digit factors 1-digit and 6-digit factors 2-digit and 3-digit factors					
4. Divide whole numbers 2,3-digit dividend --1-digit divisor --2-digit divisor 4,5-digit dividend --1-digit divisor --2-digit divisor Square roots					
5. Estimate products and quotients					
D. Addition-Subtraction Algorisms 1. Use algorisms for n-place addition-subtraction Long form --Expanded form --3-step --4-step --Number pattern Short form					
2. Check addition-subtraction					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGE	189 - 220	221 - 252	253 - 288	289 - 316	317 - 332
E. Multiplication-Division Algorisms					
1. Use of algorisms for multiplication					
Horizontal form					
--Equation					
--Standard form					
Vertical forms					
--Expanded					
--3-step					
--Lattice					
--Flow charting					
2. Use algorisms for division					
Horizontal form					
--Equation					
--Standard form					
Vertical forms					
--Scaffold (long form)					
--Pyramid					
--Short (working form)					
3. Estimate quotients, products and square roots			281(10) 74,77(10)		
4. Check multiplication-division					
F. Operations with Fractional Numbers					
1. Recognize related terms					
Numerator					
Denominator					
2. Add fractional numbers in common form					
Addends less than one					
--Sum less than one	190-191(10) 53-4(10)/DT17(2)				
--Sum greater than one	192-193(10) 55(1)/DT17(1)				

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER	7	8	9	10	11
PAGES	189 - 220	221 - 252	253 - 288	289 - 316	317 - 332
Addends greater than one					
--One addend greater than one	195(10)				
--Two addends greater than one	194-197(10) 55(2)/DT17(1)				
3. Subtract with fractional numbers in common form					
Fractional numbers less than one	190-191(10) 53-4(6)/DT17(2)				
The given addend less than one	192-193,200(10)				
Fractional numbers greater than one	194,201-203(10) 55,57(10)/DT17(5)				
4. Multiply fractional numbers in common form					
A fractional number less than one					
--By a whole number	198(10) 56(4)/DT17(4)		253(10) 71(10)/DT22(4)		
--By a number less than one			254-257(10) 72(6)/DT22(4)		
A mixed fractional number					
--By a whole number	199(10) 56(10)		261(10)		
--By a mixed fractional number			260-261(10) 73(9)/DT22(3)		
5. Add-subtract with fractional numbers in decimal form					
1-place decimal numbers	206-207(10) 58(10)/DT18(2)				318(3)
2-place decimal numbers	206,208(10) 58(8)/DT18(8)				218(8)
3-place decimal numbers					310(3)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
6. Divide with fractional numbers in common form					
A fractional number					
--With a whole number			268-269(10) 75(10)/DT23(4)		
--With a fractional number (reciprocal)			272,275(10) 76(8)		320(10) 88(2)
A whole number with a fractional number			273-274(10) 76(8)		
7. Multiply fractional numbers in decimal form					
1,2,3-place decimal numbers less than one by					
--Whole numbers	209-210(10) 59(5)/DT18(9)		262(5)		
--Multiples of 10	211(10) 60-1(10)/DT18(10)		262(10)		
--1-place decimal numbers less than one			262(10) 24(6)/DT22(4)		
1,2,3-place mixed decimal numbers by					
--Whole numbers	210(10) 59(10)/DT18(3)		263(10) 74(4)/DT22(2)		318(6) DT26(4)
--1-place mixed decimal number			264-265(10) 74(4)/DT22(1)		
8. Divide with fractional numbers in decimal form					
1,2,3-place mixed decimal numbers with					
--Whole numbers without remainder			269,271(10) 76(10)/DT23(3)		318-319(10) 33(10)/DT28(4)
--Whole numbers with remainder			270(10) DT23(1)		318-319(10)
--1,2,3-place decimal numbers without remainder			276-277(10) 77(10)/DT23(4)		321(10) 8-9(5)/DT28(4)
1,2,3-place decimal numbers less than one with 1,2,3-place decimal numbers less than one			276(10) DT23(2)		

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
9. Add-subtract fractional numbers in percent form	212(10)				
10. Calculate percentages					
Specified percents of numbers	213,209(10) 61(10)/DT18(4)		284(10)		323(10) 9C(8)/DT26(8)
Percent one number is of another			284(10)		322(10) 90(8)
11. Relate fractional numbers in percent form to					
Fractional numbers in common form					
Fractional numbers in decimal form					
12. Perform operations with rational numbers					
Addition					330(8)
Multiplication					330(8)
G. Operations with Integers					
1. Perform operations with integers					
Addition					327-329(10) 92(4)/DT27(8)
Subtraction					327-329(10) 93(10)/DT27(8)
H. Extensions					
1. Complete number patterns					
Magic squares					
Linear functions					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
2. Recognize alternate algorithms Mental arithmetic Flow charting Lattice method of multiplication Checking by "casting out nines"		235-237(8) 68(2)/DT20(1)		294-297,304(10)	
3. Find the square root of a number by prime factorization					
III. Sets A. Recognition 1. Recognize sets from description or roster Members of a set Diagrams --Brace rotation		244-249(10) 69-70(10)/DT20(3)			
2. Recognize relations between two sets Subset (⊂ notation) Equivalence Nonequivalence Equality					
3. Recognize special sets Empty set Equal sets Finite sets Infinite sets Sets of equal subsets Universal set Solution set		222-226(10) 62-3(10)/DT19(3)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
Sets of number pairs --Ordered pairs --Coordinates of points Sets of points					
4. State cardinal number property of sets n ( ) notation					
B. Operation 1. Recognize related symbols ∪(union) ∩(intersection)					
2. Perform operations Matching members of sets --One to one --One to many Union Intersection Replacement		222(10) 62-3(10)/DT19(3)			
3. Illustrate properties of union Associativity Commutativity					
4. Recognize Venn Diagrams representing Subsets Union Intersection					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
IV. Problem Solving					
1. Solve word problems involving					
Problem solving methods					
--Five-step method					
Mathematical operations					
--Addition-subtraction					
--Multiplication-division					
Different sets of numbers					
--Whole numbers					
--Fractional numbers	205,215(10) 55(6)		253,255,259, 26,278-279(10)		
--Decimals and percent	207,212-215, 217(10) 59(3)		262,277-280(10)		
--Negative integers					326(4)
Different content domains					
--Logic		240(9) 69(10)/DT20(6)			
--Measurement				390,306,309, 311(10) 85-6(10)/DT24-5(10)	
--Money					
--Probability	216-217(6)		278-279(10) 78(10)/DT(6)		
--Rates					
--Statistics					
--Social activities					
--Speed, time, distance					
--Ecology					
--Astronomy					
--Sports					
--Gravity					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
V. Number Sentences					
1. Decode symbols in numbers sentences					
>, <		224-225(10) 63(10)	282(9)		
+, ÷					
x,					
=, #					
n and m as place holders		222-227(10) 63(10)		289,292-3(10)	
2. Identify number sentences					
Number phrases		221(10) 62,66(10)/ DT19(2)			
Equations		221(10) 62(5)/DT19(1)			
--Open					
--Closed					
--True					
--False					
Inequalities		221(5) 62(3)/DT19(1)			
3. Use >, <, = to make an open sentence true					
4. Use ( ) to show mathematical properties					
Associativity					
Commutativity					
Order in subtracting					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
5. Recognize number sentences involving					
Equivalent sentences		226-227(10) 64(10)/DT19(4)			
Graphing					
Sets of solution		224-225(10) 62-3(10)/DT19(6)			
Functions					
Families of facts					
Story problems		223(6) 64(4)			
Logic sentences					
Exponents					
Square roots					
Decimals					
Percents					
Two or more variables					
VI. Applications of Mathematics					
1. Apply mathematical concepts and skills to					
Science					
--Outer space					
--Gravity		231(10)			
--Moon					
--Body					
--Temperature					
--Earth's surface					
Business and money	208,214(8)				
School and everyday life					
--Population					
--Time		231(10)			
--Pollution					
Transportation and communication					
--Vehicles					
-Distance, mile	207,214(4)	231(10)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
Construction and measurement					
--Design				294-297,304(10)	
--Scale drawing				302(10)	
--Using formulas		230(10) 66(10)/DT20(4)		306-310(10) 85-6(10)/ DT24-5(10)	
VII. Measurement					
1. Use standard units of measurement					
Capacity					
--Pints					
--Quarts					
--Gallon					
--Peck					
2. Time					
Money	206,210(10)				
Weight					
--Ounce					
--Pound					
--Gram					
--Kilogram					
Temperature					
--Degree					
Length					
--Inch		230(10)		289(3) 79(1)	
--Foot				289(3) 83(2)	
--Yard				289(3) 83(2)	
--Mile				289(3) 79(1)	
--Centimeter				289(6) 83(1)	
--Meter				289(3)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
--Kilometer				289(3)	
Area					
--Unit area					
--Square inch		230(1)		306(1) 79(1)	
--Square foot				306(1)	
--Square yard				306(1)	
--Acre				306(1)	
--Square mile				306(1)	
--Square centimeter				306(1)	
--Square meter				306(1)	
--Hectare				306(1)	
--Square kilometer				306(1)	
Volume					
--Unit cube					
--Cubic inch		230		312(6)	
--Cubic foot				312(1)	
--Cubic yard					
--Cubic centimeter				312(3)	
--Cubic meter					
Angle					
--Degree				289(6)81 79(10)	
2. Use standard measuring instruments					
Compass				294-297(10) DT24(3)	
Ruler				294-297,289(10) 80(6)/DT24(3)	
Protractor(construction)				296-297,289(10) 80(6)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
VIII. Geometry					
A. Nonmetric					
1. Identify basic concepts					
Points					
--Location (number plane)				298-299(10) 82(10)/DT24(5)	
--Naming				298-299(10) 82(3)	
Lines					
--Determining					
--Parallel				294(10) 80(1)	
--Perpendicular				294-295(10) 80(3)	
--Intersecting				292(4) 80(3)	
Line segments					
--Congruent					
--Bisector				295(6)	
--Perpendicular					
--Perpendicular bisector				294(4)	
Rays					
Angles					
--Right					
--Congruent					
				80(3)	
--Bisector				295(5) DT/24(4)	
--Of triangles					
--Of polygons				293(7) 80(5)	
--Vertical (opposite)				293(10)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
Planes					
--Number plane					
--Points on		232(2) 67(10)/DT20(10)		298(10) 82(10)/DT24(5)	
--Lines on				298(8) 82(3)	
--Shapes on				299-301(10) 82(1)	
--Intersection					
--Parallel					
Curves					
--Simple closed curve					
--Open curve					
2. Recognize geometric shapes					
Triangles					
--Right					
--Isosceles					
--Equilateral					
--Congruent					
--Similar				81(2) 303(4) 81,83(5)/DT25(2)	
Circle					
--Radius					
--Chord					
--Diameter					
--Center					
--Circumference					
--Area					
--Semicircle					
Ellipse					
Parallelogram					
Rectangle					
Squares					
Rhombus					
Pentagon					
Hexagon					
Octagon					
Quadrilateral					
--Similar				304(8) 83(5)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
Polygons					
--Perimeter					
--Diagonal					
--Regular				307(1)	
3. Recognize closed surfaces					
Cube					
--Edge					
--Face					
--Vertex					
Cylinder					
--Base					
--Rounded surface					
Prism					
Pyramid					
Sphere					
--Radius					
--Diameter					
--Center					
--Great circle					
Cone					
4. Construct geometric figures					
Lines					
--Parallel lines				294(1) 80(1)	
--Perpendicular lines				294(3) 80(1)	
--Congruent lines					
--Perpendicular bisector of a line					
--Compass and ruler				295(1)	
--Paper folding				295(1)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
Angles					
--Congruent angles				297(1)	
--Bisector of an angle				296(2) DT24(4)	
--Ruler and compass				296(1) DT24(4)	
--Paper folding				296(1)	
Triangles					
--Congruent triangles				297(6) 81(2)	
Square					
Rectangle				294(1) 80(1)	
Ellipse					
Regular hexagon					
Similar polygons				304(4)	
Quadrilateral				80(3)	
5. Recognize regions					
Rectangular regions					309,306,310-311(4) 85(3)
Triangular regions					309,306(5) 85(4)/DT25(2)
Square regions					306,314(2) 85(1)/DT25(1)
Parallelogram regions					309,306(3) 85(2)/DT25(1)
Circular					310-311(10) DT25(3)
Irregular					311(3) DT24(4)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
6. Identify topological concepts					
Closed curves					
--On, outside, inside					
Closed surfaces					
--Vertex, edge, face					
Networks, Euler's formula					
Covering the plane					307(6)
7. Match geometric figures					
Congruence of segments and shapes					
--Slides, flips, turns					300(7)
Line symmetry of shapes					301(10)
Similar figures					303-304(10) 83(5)
B. Metric					
1. Measure length					
Curves				291(8)	
Distance between two points on number plane					
Distance of a point to a line (Pythagorean Theorem)					308(10)
Line segments					
--By ratio and scale					302-303(10) 83(3)
Perimeter of polygons					309(8) 85(5)
Circumference ($C=2\pi r$)				290-1(10) 79(10)/DT24(4)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
2. Determine area of regions					
By unit count					
--Parallelogram					
--Rectangle					
--Square					
--Triangle					
By formula					
--Parallelogram					306,309,311(4) DT25(1)
--Rectangle					306,309,311(6) 85(4)
--Square					306,309,311(3) 85(2)
--Triangle					306,309,311(6) 85(1)/DT25(2)
--Surface of space figures					306,309,311(7) 86(6)
--Circular regions (πr^2)					310-311(6) 85(4)/DT25(3)
--Irregular regions (estimate)					
3. Determine volume of space figures					
By unit count					
--Cube					
--Rectangular prism					
--Irregular					
By formula					
--Cube					312-313(3) 86(1)/DT25(1)
--Rectangular prism					312-313(6) 86(2)/DT25(3)
--Cylinder ($h\pi r^2$)					312-313(5) 86(3)
4. Determine angles					
Sum of angles on same side of a straight line					292(10)
Sum of angles formed by two intersecting lines					292(4)

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
Sum of angles in a triangle				292-3(10) 80(2)/DT24(1)	
Sum of angles in a polygon				293(5) 80(6)/DT24(3)	
IX. Logical Thinking					
1. Use set diagrams (Venn Diagrams) to make a statement					
"All-some" - statements		244-5(10) 69(6)/DT20(2)			
"If-then" - statements		244-5(3) 70(5)			
2. Use set diagrams to determine whether a statement is true or false					
"If-then" - statement		244-5(10) 70(3)			
"If not-then" - statement					
3. Make statements to disagree with					
"No-or some" - statements		240-1(10) 69(4)/DT20(4)			
"All-or some" - statements		242-3(10) 69(6)/DT20(5)			
4. Make statements to disagree with					
"No-or some" - statements		240-1(10) 69(4)/DT20(4)			
"All" - statements		242-3(10) 69(6)/DT20(2)			

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
5. Make deductions Using a universal and specific premise					
--If all, if one - then		246-7(10)			
By the method of elimination					
--If not - then		248-9(10) 70(5)			
X. Functions and Graphs					
1. Recognize number pairs					
Ordered pairs		228,232-3(10) 67(2)/DT20(2)		298(10)	92(3)
Coordinates of points		232-3(10) 67(10)/DT20(2)		298-9(10) 82(10)/DT24(5)	
2. Define function as a mapping of one set into another set		232-3(10) 67(10)/DT20(2)			
3. Recognize f(m) notation		232(10) 67(4)/DT20(2)			
4. Use the number plane to represent linear functions					
x, f(x) axes				298-9(10)	
Graphs					
--On number line		224-5(10) 63(10)			
--On number plane				298-9(10) 82(7)/DT24(1)	
Bar graphs				305(4) 84(3)	
Double bar graph				305(8) 84(4)	
Tables				305(2) 84(3)	

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
5. Translate functional data to number sentences					
Function rules		228(10) 65,67(8)/DT19-20(4)		298(3) 82(1)/DT24(1)	
Rates		65(5)			
Sequences		229(8) 65(5)			
XI. Probability and Statistics					
1. Recognize basic concepts					
Probability (meaning)	216-17(10) 61(6)				
Average					
Range					
Mode					
Median					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 317 - 332
2. Relate probability to					
Sets and subsets			278-279(10) 78(10)		
Cross product combination			278-279 (10) 78(5)		
Collecting and comparing data					
Using data					
Graphing data					
--Tables					
--Bar graphs					
--Double bar graphs					
3. Recognize probability values					
Zero	216-217(0)				
One	216-217(0)				
4. Determine the probability of events					
Two mutually exclusive events			278-279(10) 78(6)/DT22(4)		
Independent events			278-279(10) 78(8)/DT22(2)		
XII. Number Theory					
1. Recognize special sets of numbers					
Factors					317(2) 87(1)
--Common factors					
--Greatest common factors					
--Prime numbers					317(2) 87(2)
--Properties					
--Prime factorization			259(8) 72(10)		
--Goldbach conjecture					

HOUGHTON MIFFLIN INSTRUCTIONAL OUTCOMES
GRADE 6 (continued)

CHAPTER PAGES	7 189 - 220	8 221 - 252	9 253 - 288	10 289 - 316	11 217 - 332
Multiples					317(1) 87(5)/DT28(2)
--Common multiples					
--Of 10,100					
--Of 2,3,4,5,6,8,9					
--Powers of 10					
--Least common multiple					
Perfect numbers					
Modulo 7 numerals					
Modulo 12 numerals					
2. Recognize patterns of numbers and operations					
Magic squares					
Checking by eliminating nines					
Divisibility rules					

DISTRIBUTION LIST

5 - Dr. Richard Schutz
6 - Dr. Robert Baker
1 - Mr. William Hein
1 - Dr. Robert Berger
1 - Dr. Robert O'Hare
1 - Dr. Aaron Buchanan
1 - Dr. Elijah Babikian
1 - James Winchester
5 - P. Dev. CRC
11 - Library
1 - Archives
15 - ABJ
1 - Linda Lester